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MONTHLY WEATHER REVIEW

MARCH 1944

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CORRECTION

MONTHLY WEATHER REVIEW, January 1944, vol. 72, pages [illegible] and 33, in the table heading "Year 1943" should read "December 1943." February 1944, vol. 72, page 58, table headed "Severe Local Storms," the first entry "Hugo, Okla., etc." should be deleted since this storm occurred in *March* instead of February as erroneously reported.

MONTHLY WEATHER REVIEW

Editor, EDGAR W. WOOLARD

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MARCH 1944

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MAPS OF PERCENTAGE FREQUENCIES OF VERY DRY, MODERATE, AND VERY WET MONTHS

By STEPHEN S. VISHER
[Professor of Geography, Indiana University, Bloomington, Ind., March 1944]

THE following 36 maps show the percentages of each month which have precipitations of less than 1 inch, of 2 to 4 inches, and of 5 inches or more, respectively. They are based on the State average records for 55 years, 1886–1940, given in 12 tables in J. B. Kincer's *Normal Weather for the United States*, Weather Bureau, Washington, 1943.

Although Kincer's 36-page publication presents many more details than do these maps, the maps are justified because they make conspicuous highly significant data on the relative frequency of exceptionally dry and exceptionally wet months and also reveal how often moderate amounts (2 to 4 inches) are received. They call attention to Kincer's valuable publication, which tabulates also the frequencies of precipitation totals of 1–1.99, 2–2.99, 3–3.99, 4–4.99 inches, and presents for each month four maps, of average temperature and precipitation by States, of lowest temperature, and of average number of days with minima of zero or lower.

A monthly precipitation of less than one inch means an arid condition except in months that are cold. Conversely, a monthly precipitation of 5 inches or more indicates a highly humid condition, except in months that are hot. Thus, 24 of these maps suggest the frequency of aridity and of super-humidity.

The other 12 maps show the relative frequency of months which have more moderate amounts of precipitation (2 to 4 inches). To be sure, in dry regions a monthly precipitation of nearly 4 inches is far above average, and hence not "moderate," and, conversely, in humid regions a monthly total of 2 inches is relatively dry, but as a compromise, 2 to 4 may be classed as moderate.

The numeral within each State is the percentage for that state as given by Kincer. The New England States are combined, as are Delaware and Maryland. The isolines and shading, while doubtless subject to criticism at various points, make the data much more readily visible, and hence increase their utility.

FREQUENCIES OF DRY MONTHS (STATE AVERAGES OF LESS THAN ONE INCH)

Map 1 (January) shows that during this month most of the East and Pacific Northwest nearly always receive more than 1 inch of precipitation, while much of the west-central part of the country receives less than 1 inch during more than half of the Januaries. North Dakota has a January precipitation of less than 1 inch in 95 percent of the years. Nebraska is second in dryness, with 91 percent of the Januaries receiving less than 1 inch.

Map 2 (February) reveals some interesting contrasts to January. The eastern and northwestern areas, always receiving more than 1 inch, are much reduced. Also reduced is the region with many dry Februaries. South Dakota slightly exceeds North Dakota in the frequency of dry Februaries.

Map 3 (March) reveals that in only 1 year, in the 55 studied, did most of the eastern third of the country receive less than 1 inch of precipitation while in a large southwestern region and in a sizeable north-central one more than half of the years were that dry. North Dakota was most often that dry, followed by New Mexico.

Map 4 (April) reveals that precipitation totals of less than 1 inch are far less common than in March or in the winter, except in the Southwest. They are almost lacking in the East, except part of the Southeast. They are most frequent in Arizona and Nevada, 89 and 71 percent, respectively.

Map 5 (May) reveals an increase in the East and West in the frequency of excessively dry Mays and a decrease in the central zone. In Arizona 98 percent of the Mays receive less than 1 inch, in Navada 67 percent. The least arid part of the country in this month extends from Kansas to the Atlantic coast and from Tennessee to Wisconsin.

Map 6 (June) reveals that in nearly all of the eastern half of the country at least 1 inch of precipitation is received in June, but that in California and Arizona 95 percent of the Junes receive less than 1 inch.

Map 7 (July) shows an eastern migration of the line of "no month with a State average of less than 1 inch." The eastward shift is most notable in the northern half of the country. However, almost to the Rockies less than one July in 20 receives less than an inch of rain. In California and Nevada by contrast, 100 percent and 98 percent, respectively, of the Julies receive less than one inch. In Oregon and Idaho the percents are 87 and 85, respectively. New Mexico, however, is no oftener arid than is Arkansas.

Map 8 (August) indicates little change from July except that Minnesota and Iowa are far less often dry in August than in July while Michigan more often is very dry in August than in July. This suggests an increasing influence of the Great Lakes in checking thunderstorms.

Map 9 (September) shows increased aridity in the Corn Belt, Southeast and Southwest, except for California. In the eastern half of the country fewer than one-tenth of the Septembers receive less than 1 inch of rain while in a large western region more than half of them are this dry.

Map 10 (October) shows a notable decrease in the frequency of precipitation totals of less than 1 inch on the Pacific slope but an increase in most of the rest of

the country. Only New England and Florida have had only 1 year so dry in the 55 years studied. More than half of the years are as dry in the Great Plains and southern Rocky Mountain region.

Map 11 (November) extremely dry Novembers are not very rare in much of the East (2–20 percent of the years) and are normal (occuring in half the years) in a large central zone. They occur 93 percent of the time in Colorado and 87 percent in North Dakota. Washington, however, has such November averages only 3 percent of the time.

Map 12 (December) reveals a general lack of aridity in the East and Northwest, but that in a large central region three-fourths of the years or more receive a State average of less than 1 inch. North Dakota is driest (93 percent) followed closely by South Dakota (89 percent).

FREQUENCY OF VERY WET MONTHS (STATE AVERAGES OF FIVE INCHES OR MORE)

Maps 13–24 present the frequencies of months during which 5 inches or more of precipitations occur—State averages.

During January (map 13) most of the country did not have State averages of 5 inches once in the 55 years studied. However, a sizable area centering in Mississippi had such wet Januaries 40 percent of the time. A Pacific Coast belt was about equally wet.

During February (map 14) precipitation totals of 5 inches or more are distinctly more frequent than in January, despite the fact that February has about one-tenth fewer days than January. The area which is this wet during half of the years is slightly to the east of the area which was wettest during January.

During March (map 15), precipitation totals of 5 inches or more for State averages continue to be lacking in most of the country. However in the Southeast, they are somewhat more frequent than in February, where from 18 to 60 percent of the Marches are that wet.

April (map 16) is more often wet than is March in the Midwest and Southern Plains regions. However, in the Pacific States and in the South Atlantic States such very wet months are distinctly less common than during March.

May (map 17) reveals that totals of 5 inches are lacking only in the western third of the country while they occur oftener than 1 year in 10 in most of the eastern half. More than a third of the Mays are this wet in an area extending from Missouri to Mississippi.

June (map 18) is distinctly less frequently very wet than is May, except in the western third of the country, where 5 inches is unknown as a State average. Very wet Junes are most common in Florida (84 percent of the years) and occur in about a third of the years in an extensive southeastern belt and in Missouri and Iowa.

July (map 19) is very wet less often than is June in the northern and central parts of the country but is more often wet in the Southeast and in Arizona. Florida receives 5 inches in July during 95 percent of the Julies and North Carolina and Louisiana in 71 percent.

August (map 20) receives 5 inches of rain distinctly less often than does July, except in Florida, where the decline is moderate (89 percent instead of 95).

September (map 21) is less often very wet than is August, except in an area extending from Wisconsin to Texas. In most of the Southeast, totals of 5 inches or more are less than half as frequent as in August.

During October (map 22), totals of 5 inches or more appear in the Pacific States which have lacked such State averages since April. They are lacking in about half of the country and are rather rare elsewhere, except near the Atlantic coast.

November (map 23) is decidedly more often very wet in the Western States and in the Mississippi Valley than is October. Along the Atlantic coast south of New England, however, November is much less often very wet than is October.

December (map 24) closely resembles January in the frequency of totals of 5 inches or more. However, such totals are distinctly less common in December than January in most of the wettest section (Arkansas to Florida). In about half of the country no December of the 55 studied had a State average of 5 inches or more. Only one December had such a total in New York, Ohio, and Missouri.

FREQUENCY OF MONTHS WITH 2 TO 4 INCHES OF PRECIPITATION

Maps 25–36 present the frequencies of months which receive a somewhat moderate amount of precipitation, amounts adequate, or nearly adequate, for most crops; conversely, flooding is not common with monthly totals of less than 4 inches, except locally during the cooler months.

Map 25 shows that in January only about one-sixth of the country ever receives less than 2 inches of precipitation (State average) while nearly two-thirds of it receives 2 to 4 inches during at least a third of the Januaries. These totals are most frequent in the Northeast.

During February (map 26) the frequency of totals of 2 to 4 inches is similar to that during January. The Midwest and much of the Southeast, however, show a decline.

March (map 27) nearly always receives 2 inches or more of precipitation in all parts of the country. Only one March in 55 was that dry in the driest States during that month, North Dakota and Montana. More than 40 percent of the Marches receive 2 to 4 inches in most of the East and the Pacific Coast States.

April (map 28) has an increased frequency of moderate wetness in the eastern two-thirds of the country, especially large in the north-central section. A decline is evident in the Southwest and near the Pacific.

During May (map 29), the Southwest receives 2 inches in less than one-tenth of the years, while 2 to 4 inches is received in about half of the years in most of the northeastern quarter of the country.

June (map 30) always receives in the Southwest less than 2 inches of rain (State average). In the northern half of the country east of the Rockies, however, totals of 2 to 4 inches are normal, occur in about half of the years.

July (map 31) reveals a northward extension of the dry Southwest to include the Northwest. However, Arizona and New Mexico much more frequently receive 2 to 4 inches in July than in June. The Southeast is much least likely to receive these moderate totals than is any other part of the eastern half of the country. (Florida had only one such July in the 55 studied.)

During August (map 32) moderate totals of rainfall (2–4 inches) are less common in the Northeast than in July, but occur in about half of the years. They are more frequent in a sizable western area in August than in July, where they occur in 0 to 10 percent of the years.

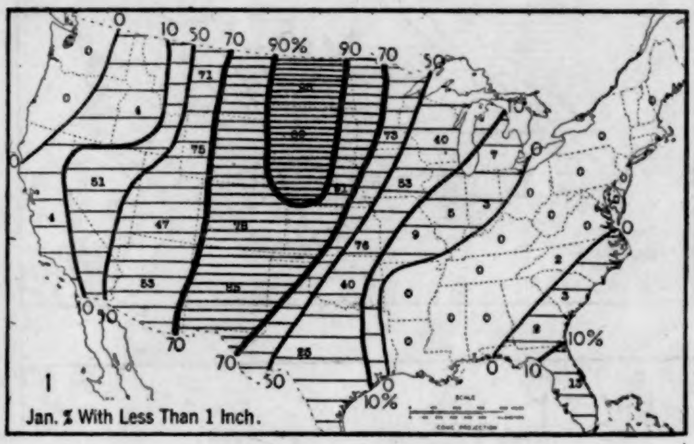
Map 33 (September) differs much more from August than August differs from July. Moderate totals of precipitation are only about half as frequent in the Southwest

in September as in August but are many times more frequent in the Northwest. In most of the northeastern quarter from 50 to 70 percent of the Septembers have such totals.

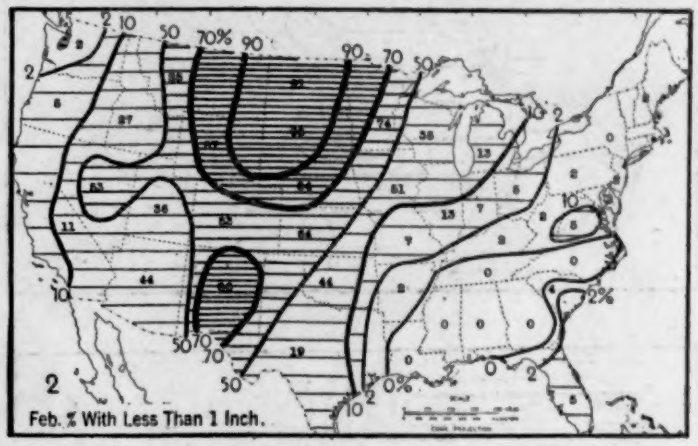
October (map 34) has moderate totals of rainfall in 20–60 percent of the years in most of the country. Nevada and Montana, however, had such totals only once, or not at all, in the 55 years.

November (map 35) receives 2–4 inches during less than one-tenth of the years in a large western region but receives them in 35 to 70 percent of the years in most of the eastern. Such a total is most common in Michigan (71) and New York (67).

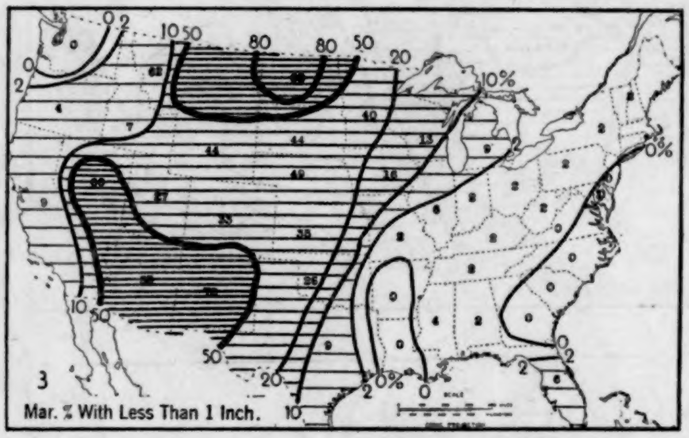
The final map (36), shows that in December, two sizable areas, one in the Dakotas and the other in New Mexico, never receive as much as 2 inches of precipitation as State averages. The Pacific States and most of the eastern half of the country receive such totals in 20 to 75 percent of the years. Such totals are most frequent in New York (76).



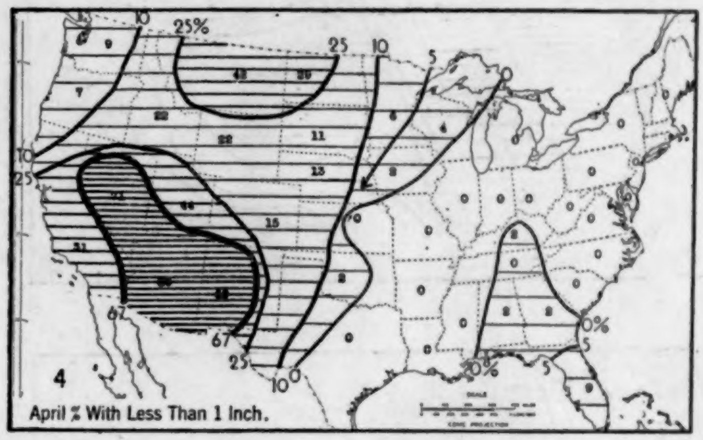
1 Jan. % With Less Than 1 Inch.



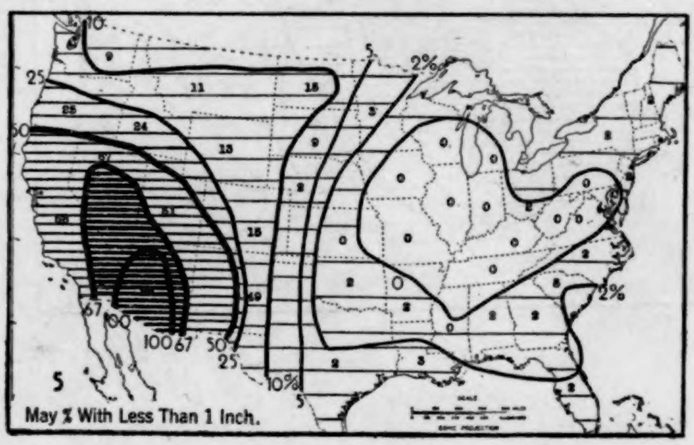
2 Feb. % With Less Than 1 Inch.



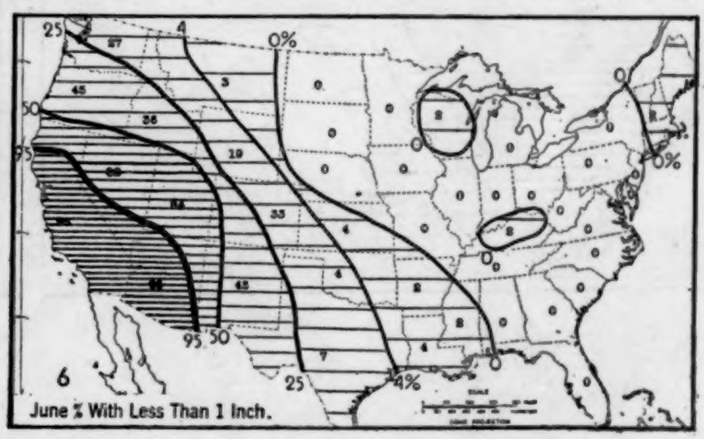
3 Mar. % With Less Than 1 Inch.



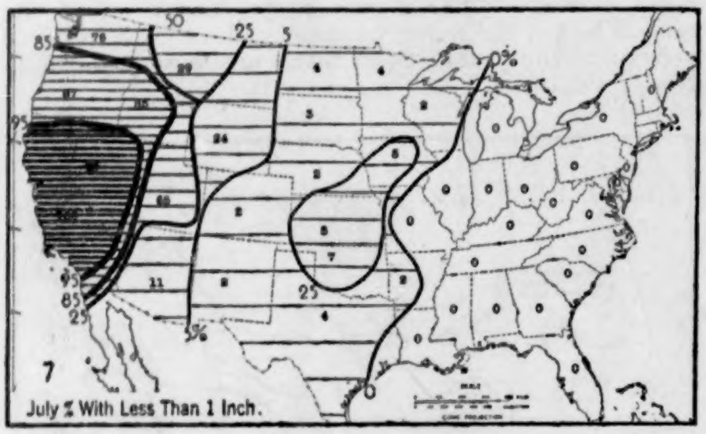
4 April % With Less Than 1 Inch.



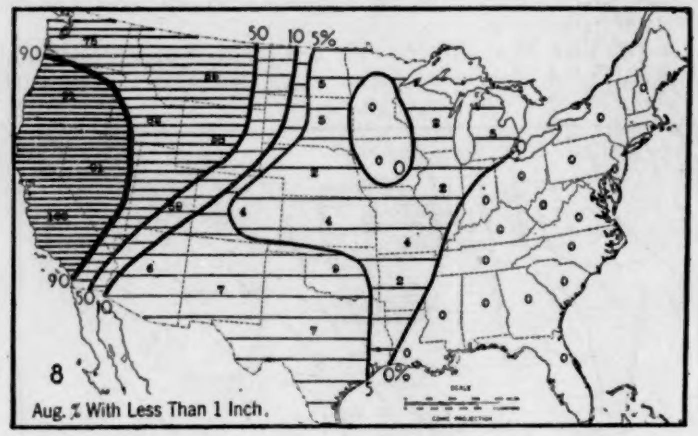
5 May % With Less Than 1 Inch.



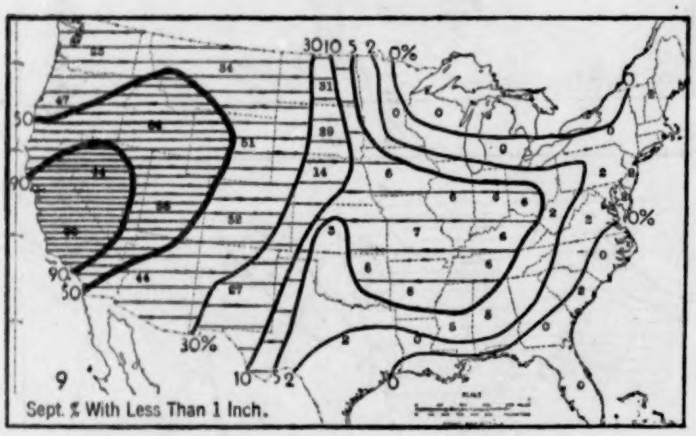
6 June % With Less Than 1 Inch.



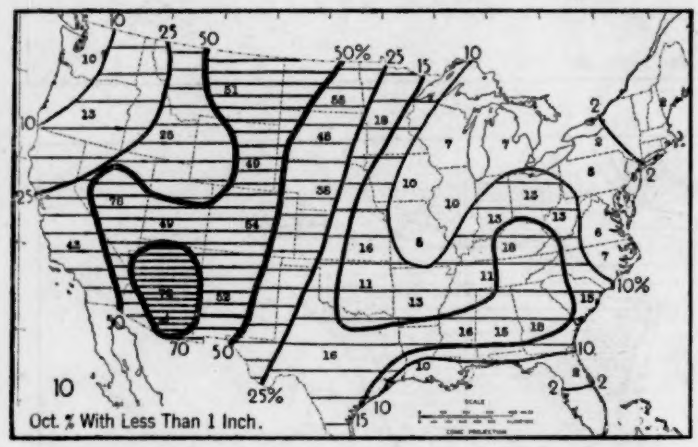
7 July % With Less Than 1 Inch.



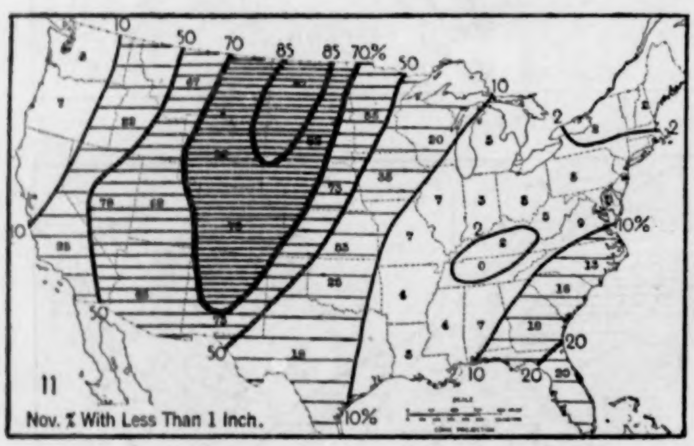
8 Aug. % With Less Than 1 Inch.



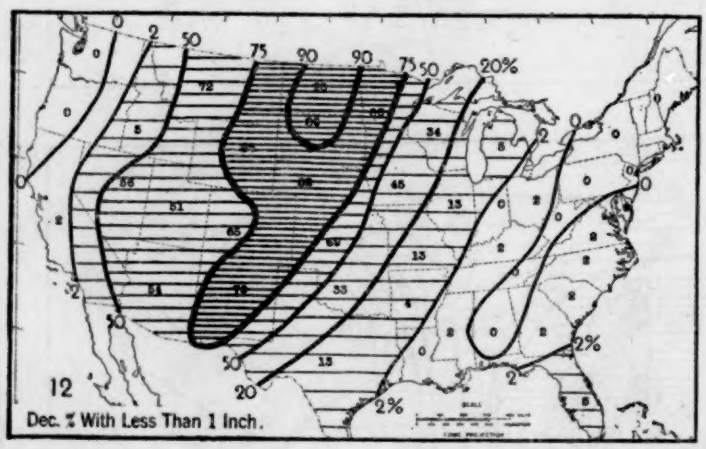
9 Sept. % With Less Than 1 Inch.



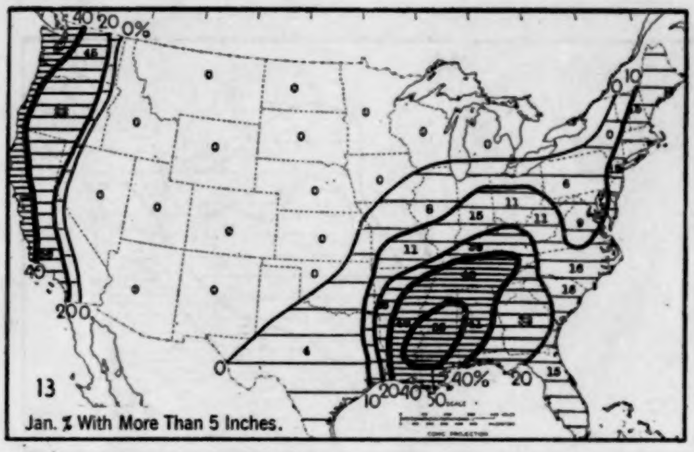
10 Oct. % With Less Than 1 Inch.



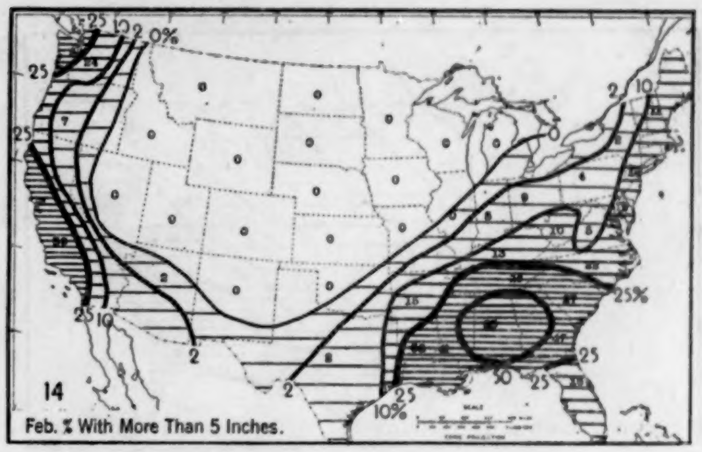
11 Nov. % With Less Than 1 Inch.



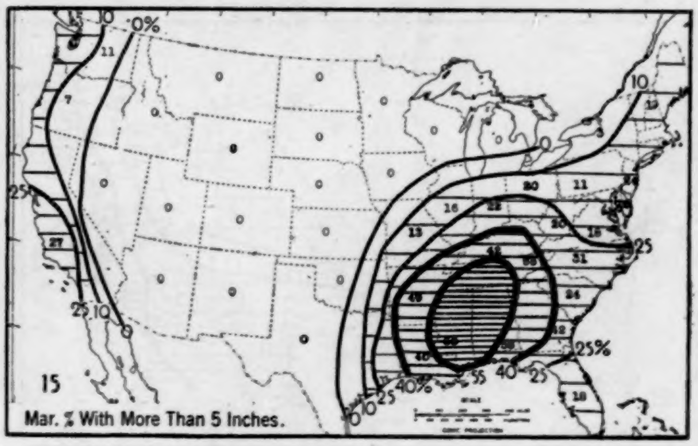
12 Dec. % With Less Than 1 Inch.



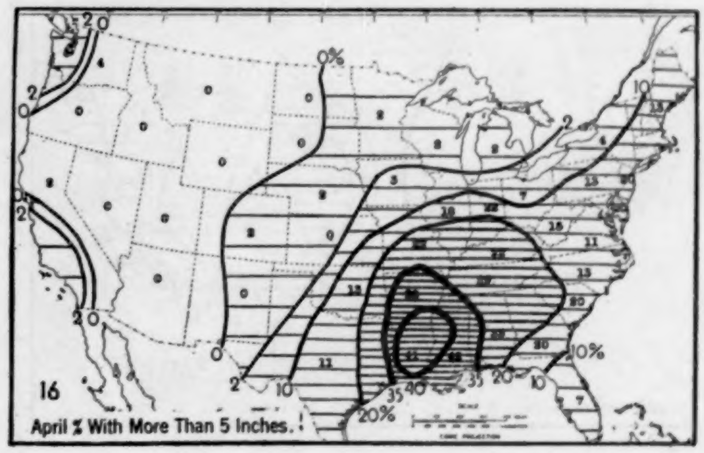
13 Jan. % With More Than 5 Inches.



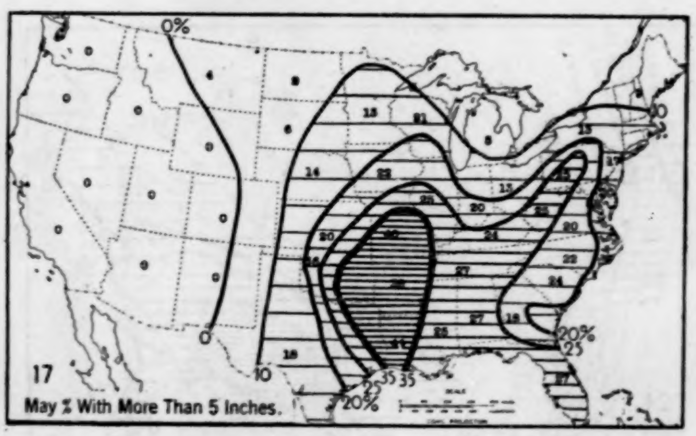
14 Feb. % With More Than 5 Inches.



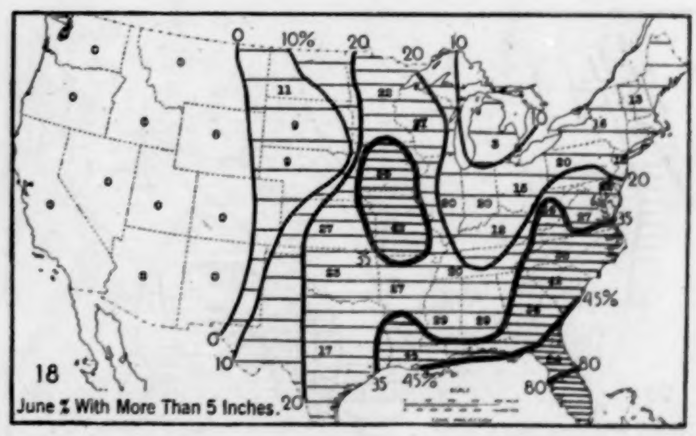
15 Mar. % With More Than 5 Inches.



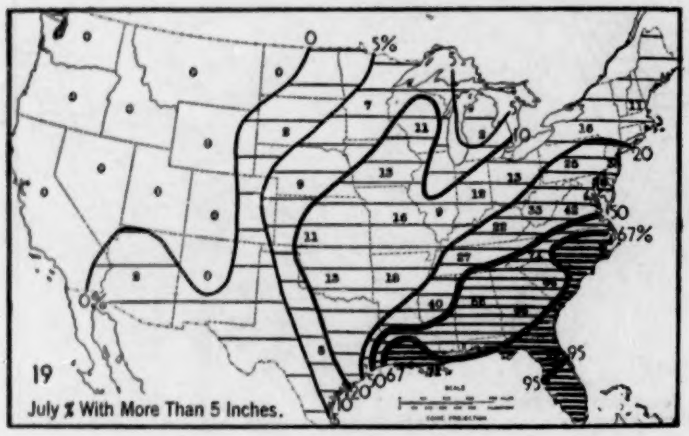
16 April % With More Than 5 Inches.



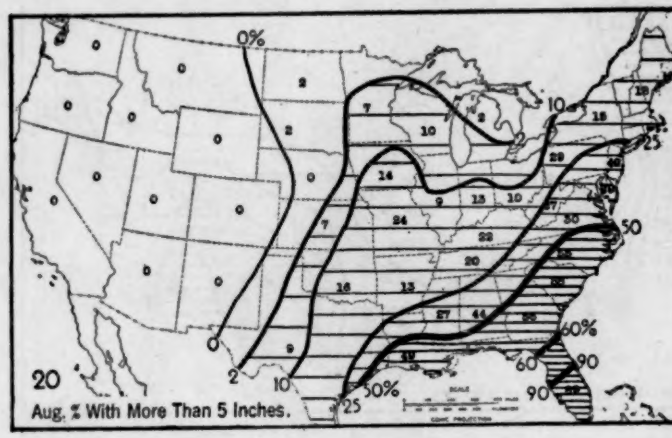
17 May % With More Than 5 Inches.



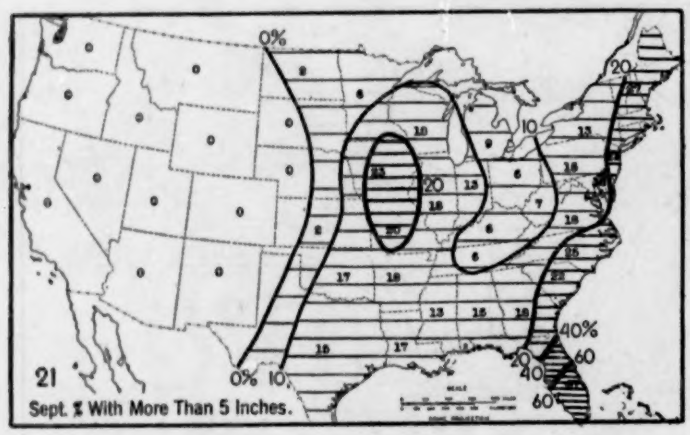
18 June % With More Than 5 Inches.



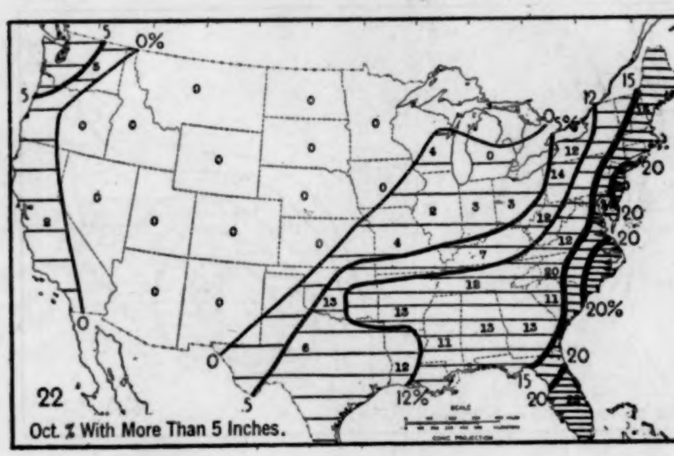
19 July % With More Than 5 Inches.



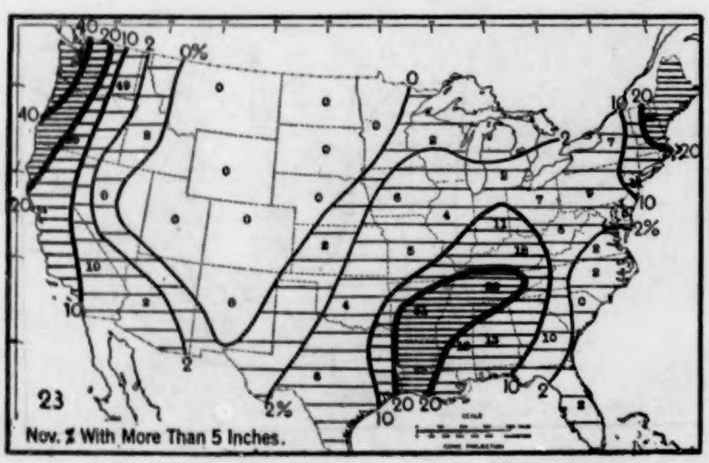
20 Aug. % With More Than 5 Inches.



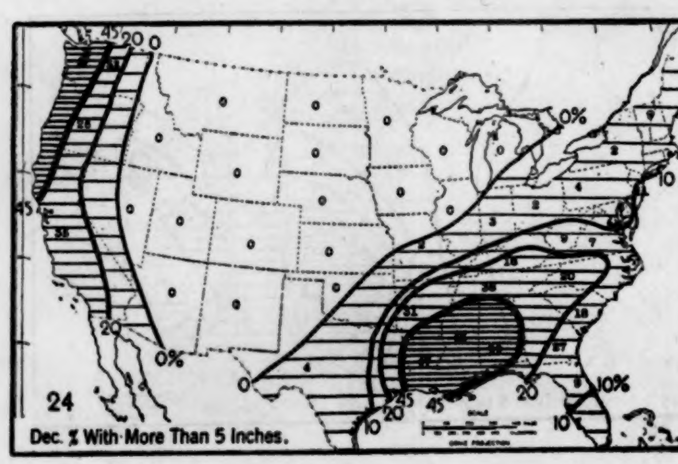
21 Sept. % With More Than 5 Inches.



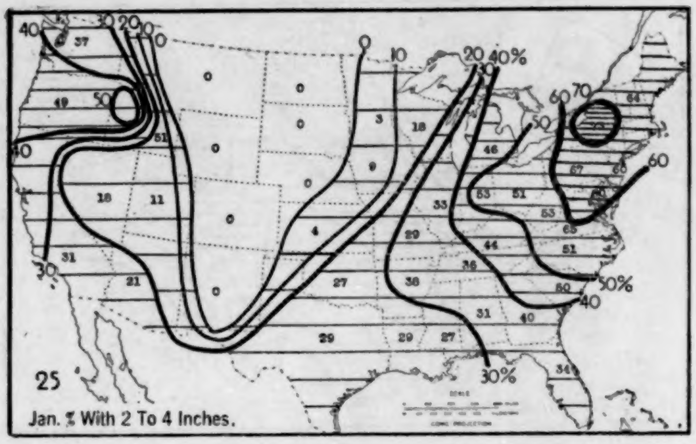
22 Oct. % With More Than 5 Inches.



23 Nov. % With More Than 5 Inches.

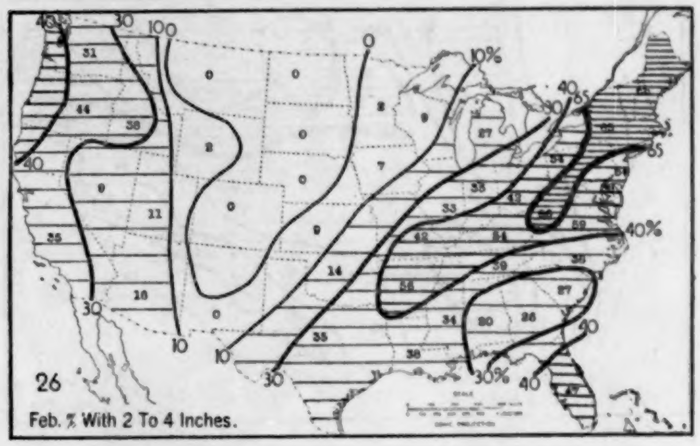


24 Dec. % With More Than 5 Inches.



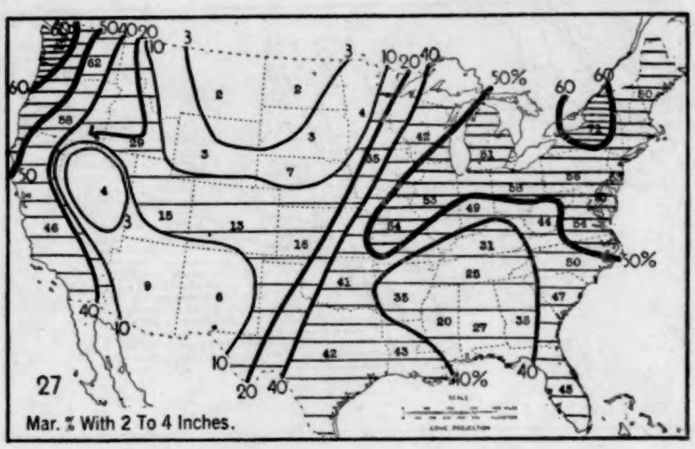
25

Jan. % With 2 To 4 Inches.



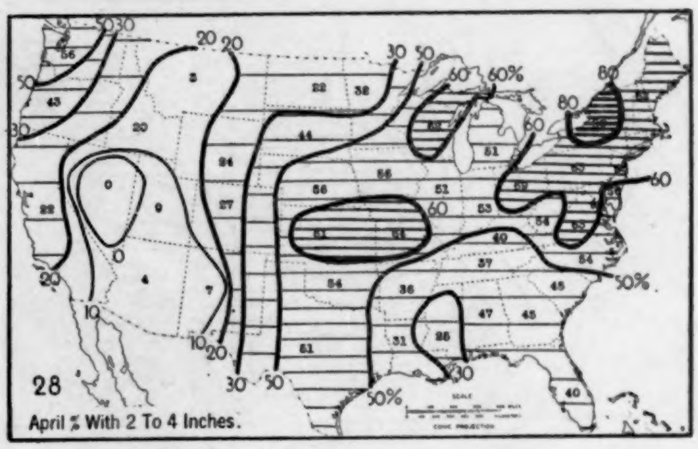
26

Feb. % With 2 To 4 Inches.



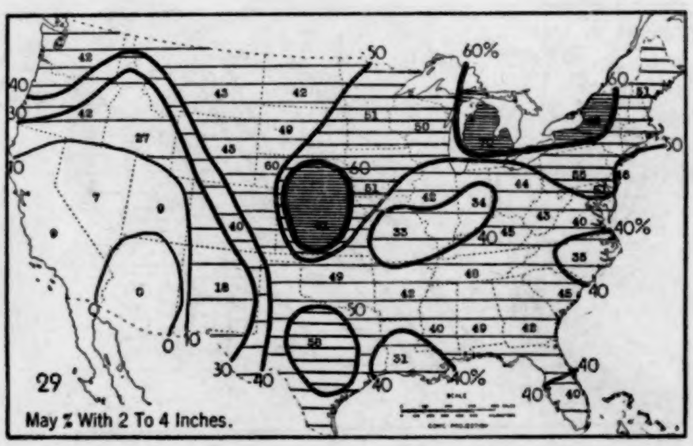
27

Mar. % With 2 To 4 Inches.



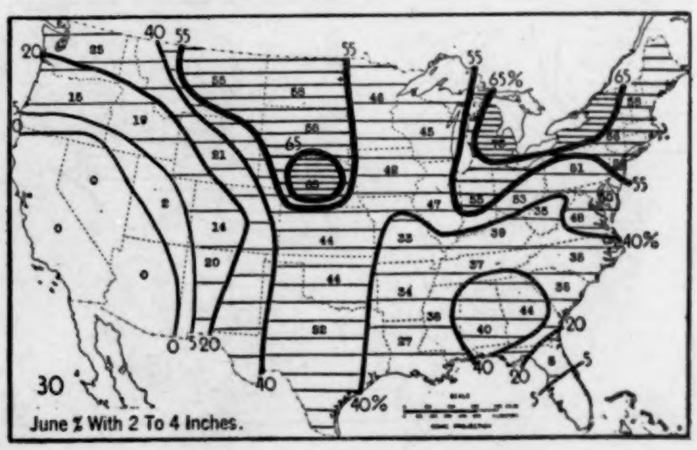
28

April % With 2 To 4 Inches.



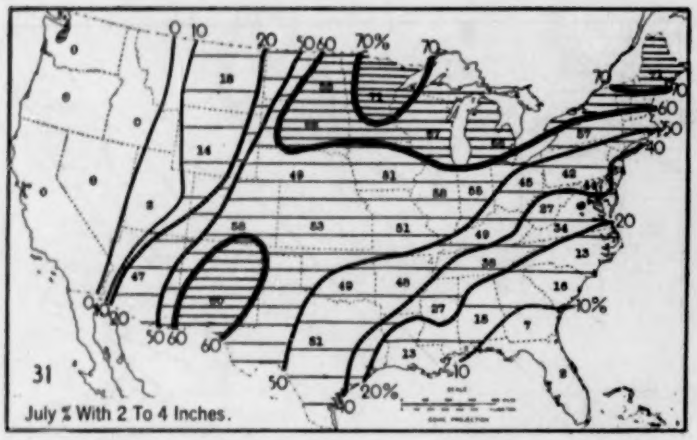
29

May % With 2 To 4 Inches.

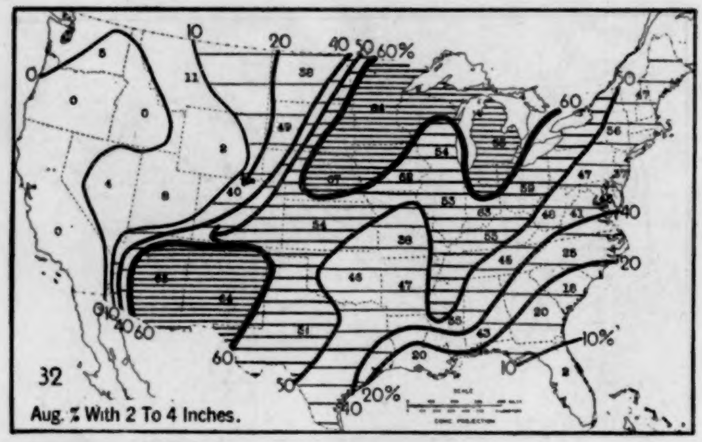


30

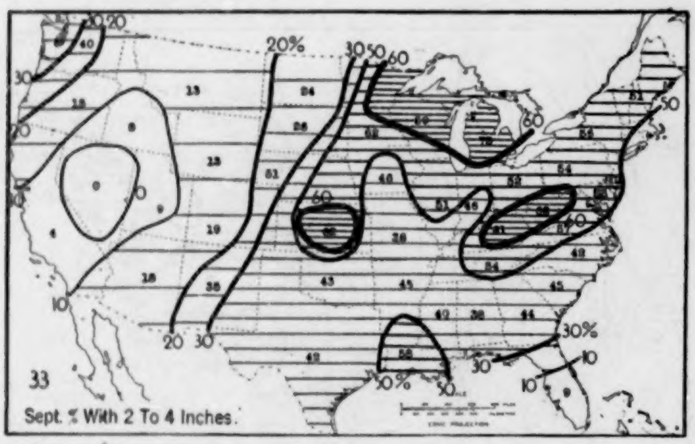
June % With 2 To 4 Inches.



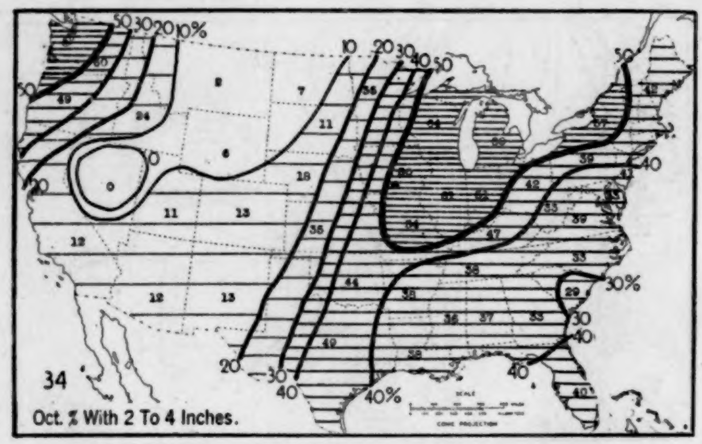
31 July % With 2 To 4 Inches.



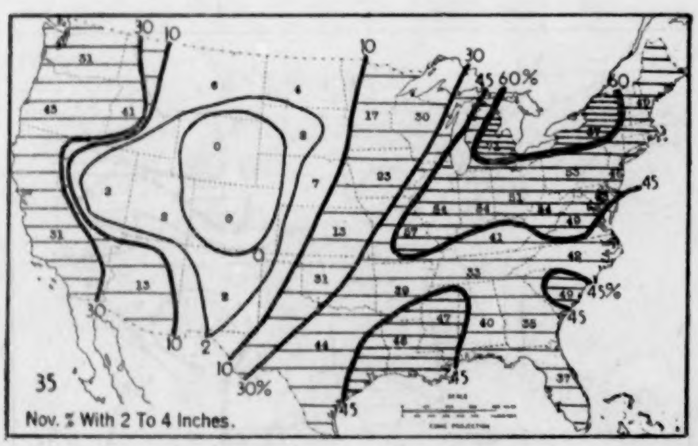
32 Aug. % With 2 To 4 Inches.



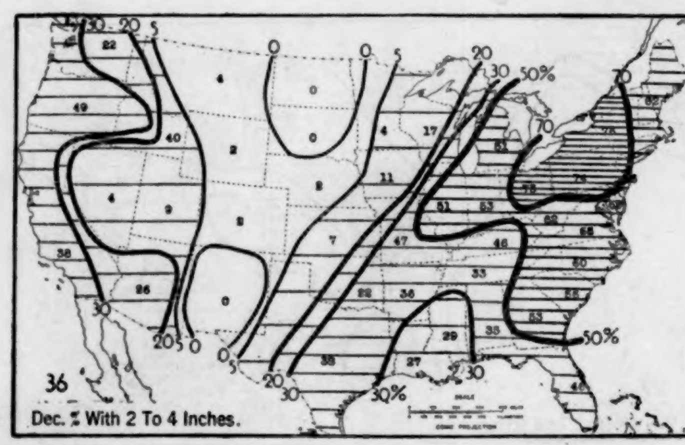
33 Sept. % With 2 To 4 Inches.



34 Oct. % With 2 To 4 Inches.



35 Nov. % With 2 To 4 Inches.



36 Dec. % With 2 To 4 Inches.

THE HAIL-THUNDERSTORM RATIO [1]

By A. L. SHANDS

[Hydrometeorological Section, U. S. Weather Bureau, Washington, D. C.]

On pages 729 and 730 of the 1941 *Yearbook of Agriculture*, "Climate and Man," there are maps showing the average annual number of days with thunderstorms and days with hail, respectively. The highest frequencies of annual hail occurrence are eight at Cheyenne, five in the vicinity of Modena-Pocatello-Helena, four over an area including eastern Wyoming, eastern Colorado, Kansas, and Northern Oklahoma. About half the country has less than three annual occurrences. Comparing these frequencies with the annual number of thunderstorm days, the ratio of hail to thunderstorm occurrence becomes as high as 20 percent in some places, and much less in most places.

An examination of random monthly climatic summaries indicated, however, that the number of days on which hail occurred anywhere in a State was usually a much higher percentage than 20 of the number of days with thunderstorms in that State. Almost always the dates of occurrence were the same.

To check that indication the number of days with hail and also the number of days with thunderstorms were counted for the 25 years from 1916 to 1940, inclusive, in the State of Iowa and in the Maryland-Delaware-District of Columbia climatic section. Iowa was chosen because it had the best collection of climatic summaries and the other section was chosen because a comparison of the hail-thunderstorm ratio could be made with detailed data on the same for Washington, D. C. The data for Iowa were compared with the point data from Kansas City, Mo., because a complete, lengthy record from the latter was also available.[2]

Tables 1 and 2 show the data on days with thunderstorms, hail, and tornadoes in the two sections. Although the tornado totals are included in the tables they are not plotted in the accompanying figure showing the comparative annual variation of frequencies because the tornado numbers are too small for adequate representation. However, it may be said that, where the tornado occurrences are appreciable, as in Iowa, the monthly variation in average number of occurrences forms a curve which is a flattened version of the hail-variation curve. In the Maryland-Delaware-District of Columbia area, the tornado occurrences are too few and the resulting curve of monthly variation too flat to make comparison with the hail curve possible.

In the figure, titled "Comparative Hail-Thunderstorm Frequencies," the data for the station and the area are compared. For both point and area, the frequency of hail increases with the frequency of thunderstorms. However, the ratio of hail to thunderstorm occurrences varies in, generally, an opposite sense, reaching a minimum at the time of the maximum occurrence of both thunderstorms and hail during the summer or as late as September. The greater ratios of the spring and winter months can be considered evidence that frontal rather than air-mass phenomena are most favorable to the production of hail in thunderstorms—but the relatively low altitudes of the zero isotherm must also be considered as an important contributing factor. At Cheyenne, for example, the low height of the zero isotherm (or, more accurately, the zero wet-bulb) above station elevation has much to do with the hail maximum at that point. There is simply less opportunity for melting or evaporation of the hailstone. The negligible number of occurrences at Key West or other tropical stations also bears this out. However, even in the latter comparison, consideration of frontal activity would yield similar theoretical results.

The State-wide or section-wide days of occurrence of thunderstorms or hail exceed the occurrences as reported by the single station or, as a matter of fact, the occurrences reported by any station within the State or section. That this should be so is obvious from the consideration that if large enough an area—for instance, the area of the earth—were used, then every day would be a thunderstorm and a hail day—perhaps even a tornado day. However, this fact does not cancel the validity of the increase in occurrences observed in the State-wide data. The thunderstorm and, to a greater degree, the hailstorm are phenomena of small areal extent. Thunderstorms are officially reported only when thunder is heard and the audibility of thunder, according to C. E. P. Brooks [3], is 10 or 12 miles under favorable circumstances and, under normal circumstances, the area within which thunder can be heard is about 113 square miles, that is, the radius of audibility is 6 miles. Hence, if only first-order stations, widely spaced, are used to study frequency of occurrences, many occurrences of thunder will be missed. Fewer would be missed by such a sparse network if lightning were the phenomenon that had to be observed. Hail is neither seen nor heard at any appreciable distance, its total area of occurrence being often of the order of 20 square miles. A sparse network will thus miss more hailstorms than thunderstorms. The use of areal occurrences corrects these faults although the exact area to be used for a proper correction is problematical and an academic question in this case, since the areal data are limited to climatic sections or States. (In a study of "Lightning Storms and Forest Fires in the State of Washington" by G. W. Alexander in the March 1927 MONTHLY WEATHER REVIEW, it is shown that the use of a dense network in that region doubled, tripled and quadrupled the days with thunderstorms indicated by W. H. Alexander's isoceraunics for the period 1904–23 [4]).

Assuming, then, that the areas are not too large to be significant, in the two examples cited the thunderstorm frequencies are approximately doubled while the hail occurrences are increased five- to ten-fold. This results in increases in the hail-thunderstorm ratios—although the pattern of the monthly variation of the ratio is retained. Comparing Iowa and Kansas City, the latter's annual ratio is increased from about 8 to 42 percent. The peak station ratios are 22 and 24 in March and November; the peak state ratios are 63, 62, and 54 in February, April, and December, respectively. The minimum ratio is 2 percent in July–August at the station, and 25 in September in the State. Comparing Washington, D. C., with its climatic section, the former's annual ratio is increased from about 4 to 19 percent. The station peaks are 12 in February and 45 in December (the latter being unusually out of line) and the section

[1] Section of an extensive report on "Thunderstorm Rainfall" being prepared by the Hydrometeorological Section for the Corps of Engineers, War Department.

[2] Hamrick, A. M. and Martin H. H. "Fifty Years of Weather in Kansas City, Mo.", MO. WEA. REV. SUPPLEMENT No. 44, 1941.

[3] Brooks, C. E. P., "The Distribution of Thunderstorms over the Globe," British Meteorological Office Geophysical Memoirs No. 24, 1925.

[4] Alexander, William H., "The Distribution of Thunderstorms in the United States, 1904-1923," MO. WEA. REV., vol. 52, July 1924. The values are not changed appreciably in the same author's study for the period 1904-33 in the MO. WEA. REV., vol. 63, May 1935, nor in the "Climate and Man" chart.

peaks are 29 in April and 22 in November. The station minima range between 0 and 2 in January and June through September; the section minima are 4 in December and 8 in both January and September.

It is worth mentioning that examination of the areal data reveals that in the winter and spring months, particularly the winter, the number of hail days often equals the number of thunderstorm days and sometimes even exceeds them. Some of this may be attributed to poor observation since it is well known that the layman often confuses hail with sleet, but the tendency is probably real and stresses the importance of the height of the zero isotherm (lowest in the winter) in influencing the production of hail and the possible production of hail without thunder, since the latter originates from an electrical discharge which arises from the breakup or motion of raindrops rather than frozen drops. Some of the winter hail occurrences are described by the observers as small hail, a hydrometeor apparently most frequent on the Pacific coast. For that section, incidentally, such occurrences have not been included in the hail-distribution chart on page 730 of "Climate and Man." Otherwise, as is evident from Lemons' hail maps,[5] at least a secondary maximum would appear along the Pacific coast.

[5] Lemons, Hoyt: "Semimonthly Distribution of Hail in the United States," Mo. Wea. Rev. vol. 71, July 1943.

The particular suggestion that the present writer has to offer is that further study be made of the areal hail-thunderstorm ratio by climatic section centers. The evidence seems convincing that the commonly held notion that hail occurrences in thunderstorms are comparatively few is erroneous. Some indication of the validity of the areal method, when States of average size are used, is the following fact. While Iowa has an area of 56,000 and Maryland-Delaware-District of Columbia an area of only 12,700 square miles, the areal annual hail-thunderstorm ratio is in both cases about five times the point ratio. Further research may show that to hold elsewhere, in which case a fivefold increase of the point ratio would yield the proper ratio, approximately, for any area. It is interesting to note that five is also the ratio of the average area of thunder audibility to the average area of a hailstorm, as mentioned earlier in this paper. For any further investigation, however, inspection of State climatic summaries indicates that in most cases it will be necessary to go back to the original manuscript records of cooperative stations for the basic data needed for a summary of areal frequencies.

U. S. DEPARTMENT OF COMMERCE WEATHER BUREAU HYDROMETEOROLOGICAL SECTION

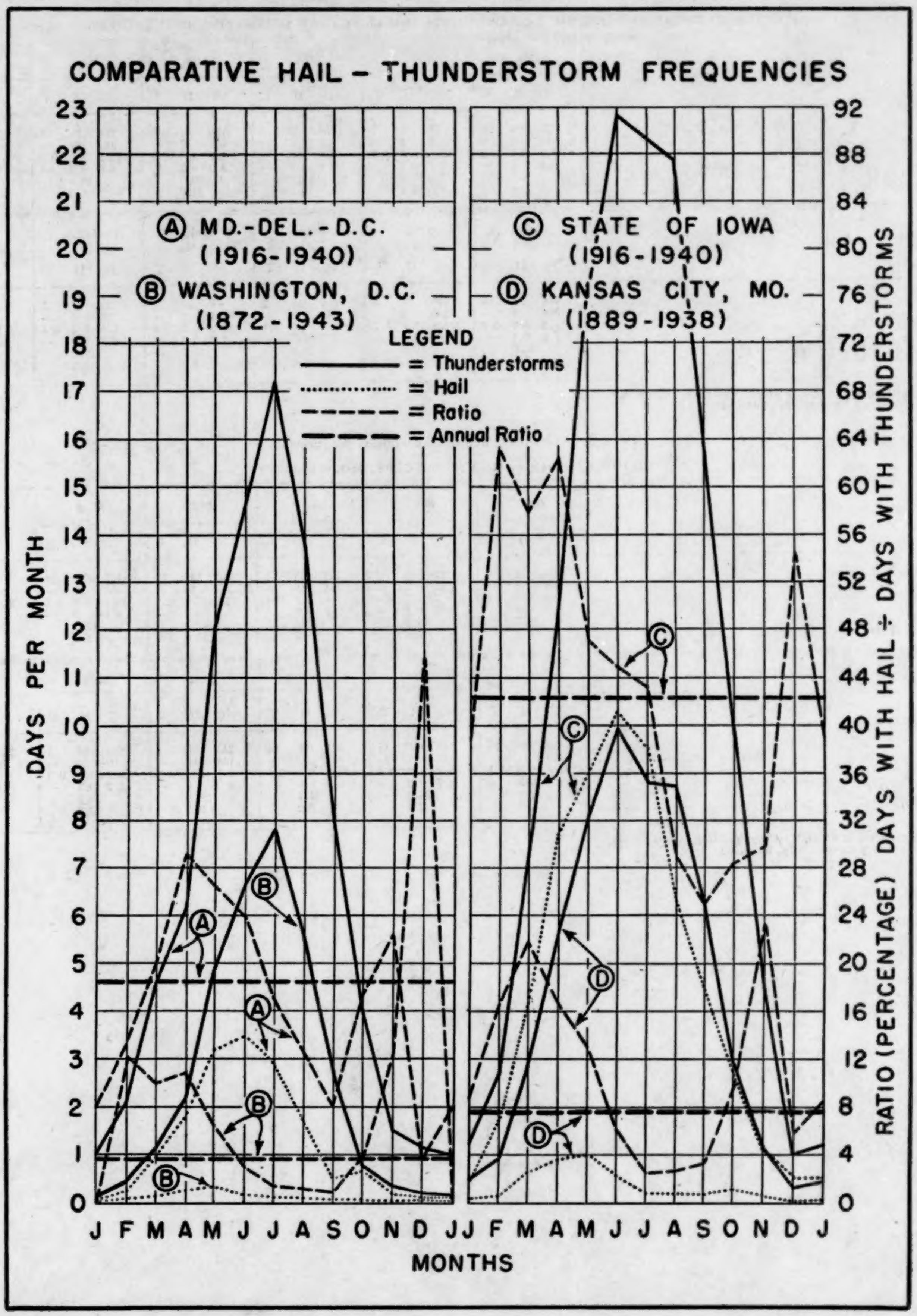


TABLE 1—*Thunderstorm-hail-tornado * frequencies*

(A) MARYLAND-DELAWARE-DISTRICT OF COLUMBIA (1916-40) vs. (B) WASHINGTON, D. C. (1872-1943)

	Jan.			Feb.			Mar.			Apr.			May			June		
	☈	H	T	☈	H	T	☈	H	T	☈	H	T	☈	H	T	☈	H	T
Totals (A)	25	2	0	53	7	2	116	23	0	150	44	2	278	78	5	350	87	2
Totals (B)	10	0	—	33	4	—	79	8	—	155	17	—	341	21	—	467	13	—
Means (A)	1.0	0.1	0	2.1	0.3	0.1	4.6	0.9	0	6.2	1.8	0.1	12.1	3.0	0.2	14.6	3.5	0.1
Means (B)	0.1	0	—	0.5	0.1	—	1.1	0.1	—	2.2	0.2	—	4.8	0.3	—	6.6	0.2	—
Percent ratio H/☈ (A)		8.0			13.2			19.8			29.3			26.4			23.8	
Percent ratio H/☈ (B)		0			12.1			10.1			11.0			6.2			2.8	

	July			Aug.			Sept.			Oct.			Nov.			Dec.		
	☈	H	T	☈	H	T	☈	H	T	☈	H	T	☈	H	T	☈	H	T
Totals (A)	414	73	5	340	44	6	184	12	2	88	16	1	31	7	3	26	1	0
Totals (B)	554	8	—	390	5	—	193	2	—	53	2	—	24	3	—	11	5	—
Means (A)	17.2	2.9	0.2	13.8	1.8	0.2	8.0	0.5	0.1	4.0	0.7	0.0	1.5	0.3	0.1	1.1	0.0	0
Means (B)	7.8	0.1	—	55	0.1	—	2.7	0.0	—	0.8	0.0	—	0.3	0.0	—	0.2	0.1	—
Percent ratio H/☈ (A)		17.0			12.7			8.0			17.5			22.6			3.8	
Percent ratio H/☈ (B)		1.4			1.3			1.0			3.8			12.5			45.5	

☈=Thunderstorms, H=hail, T=tornadoes (All: Days with —).
*Tornado frequency for area only, 1880-1942.

TABLE 2.—*Thunderstorm-hail-tornado* frequencies*

(C) IOWA (1916-40) vs. (D) KANSAS CITY, MO. (1889-1938)

	Jan.			Feb.			Mar.			Apr.			May			June		
	☈	H	T	☈	H	T	☈	H	T	☈	H	T	☈	H	T	☈	H	T
Totals (C)	31	12	0	67	43	1	182	105	11	307	192	17	477	224	34	572	257	47
Totals (D)	24	2	—	45	7	—	144	31	—	281	44	—	406	52	—	495	30	—
Means (C)	1.2	0.5	0	2.7	1.7	0.0	7.3	4.2	0.4	12.3	7.7	0.7	19.1	9.0	1.4	22.9	10.3	1.9
Means (D)	0.5	0.0	—	0.9	0.1	—	2.9	0.6	—	5.6	0.9	—	8.1	1.0	—	9.9	0.6	—
Percent ratio H/☈ (C)		38.7			63.2			57.7			62.5			47.0			44.9	
Percent ratio H/☈ (D)		8.3			15.6			21.7			15.6			12.8			6.1	

	July			Aug.			Sept.			Oct.			Nov.			Dec.		
	☈	H	T	☈	H	T	☈	H	T	☈	H	T	☈	H	T	☈	H	T
Totals (C)	559	239	28	548	157	13	401	109	14	243	69	7	114	34	1	24	13	0
Totals (D)	439	11	—	435	11	—	311	10	—	148	14	—	60	7	—	18	1	—
Means (C)	22.4	9.6	1.1	21.9	6.3	0.5	16.0	4.4	0.6	9.7	2.8	0.3	4.6	1.1	0.0	1.0	0.5	0
Means (D)	8.8	0.2	—	8.7	0.2	—	6.2	0.2	—	3.0	0.3	—	1.2	0.1	—	0.4	0.0	—
Percent ratio H/☈ (C)		42.8			28.6			24.7			28.4			29.8			54.2	
Percent ratio H/☈ (D)		2.5			2.5			3.2			9.4			23.3			5.6	

☈=Thunderstorms, H=hail, T=tornadoes (all days with —).
*Tornado frequency for area only, 1880-1942.

METEOROLOGICAL AND CLIMATOLOGICAL DATA FOR MARCH 1944

[Climate and Crop Weather Division, J. B. KINCER in charge]

AEROLOGICAL OBSERVATIONS

NOTICE.—RAOB tabular data for February 1944 (table 1) are shown hereunder; those for March 1944 will be published in the April REVIEW.—EDITOR

TABLE 1.—*Mean free-air barometric pressure in millibars, temperature in degrees centigrade, and relative humidities in percent, obtained by radiosondes during February 1944*

STATIONS AND ELEVATIONS IN METERS ABOVE SEA LEVEL

Altitude (meters) m. s. l.	Albany, N. Y. (86 m.)				Albuquerque, N. Mex. (1620 m.)				Apalachicola, Fla. (5 m.)				Atlanta, Ga. (300 m.)				Big Spring, Tex. (774 m.)				Bismarck, N. Dak.[3] (505 m.)				Boise, Idaho (868 m.)			
	Number of observations	Pressure	Temperature	Relative humidity	Number of observations	Pressure	Temperature	Relative humidity	Number of observations	Pressure	Temperature	Relative humidity	Number of observations	Pressure	Temperature	Relative humidity	Number of observations	Pressure	Temperature	Relative humidity	Number of observations	Pressure	Temperature	Relative humidity	Number of observations	Pressure	Temperature	Relative humidity
Surface	29	1,007	−5.4	75	25	836	5.6	48	29	1,020	16.0	90	27	985	9.2	80	28	928	8.8	71	29	957	−11.9	84	28	915	1.1	80
500	29	955	−6.0	72	----	----	----	----	29	962	15.3	74	27	961	9.3	78	----	----	----	----	----	----	----	----	----	----	----	----
1,000	29	896	−7.3	72	----	----	----	----	29	907	13.1	58	27	905	8.2	71	28	903	9.9	59	29	898	−8.9	80	28	900	1.8	71
1,500	29	840	−8.8	66	----	----	----	----	29	855	11.8	41	27	852	7.3	62	28	850	8.7	49	29	842	−8.7	75	28	846	−0.6	68
2,000	29	787	−9.9	62	25	798	4.0	45	29	805	9.8	40	27	802	5.6	60	28	800	7.2	42	29	788	−10.0	72	28	794	−4.0	73
2,500	29	738	−11.0	58	25	750	0.6	49	29	758	7.3	36	27	754	3.9	56	28	752	4.9	38	29	739	−12.5	68	28	745	−7.3	73
3,000	29	691	−12.9	57	25	704	−3.1	52	29	713	5.6	26	27	709	1.7	55	28	707	2.1	37	29	692	−15.1	70	28	698	−10.4	73
4,000	28	606	−16.9	45	25	620	−10.3	59	29	630	0.6	23	27	625	−3.5	51	28	624	−4.7	37	28	605	−20.4	70	28	612	−16.1	70
5,000	28	529	−23.3	41	25	543	−16.9	47	29	556	−5.7	29	26	550	−9.7	46	28	549	−11.2	37	25	528	−26.0	62	27	536	−22.6	70
6,000	28	461	−29.8	44	24	474	−23.8	37	29	488	−12.2	26	25	483	−16.2	47	28	481	−17.8	36	23	460	−33.0	55	27	467	−29.7	66
7,000	27	400	−36.7	44	23	413	−30.9	----	29	428	−19.4	36	24	422	−23.3	50	28	420	−25.0	43	19	399	−39.0	51	26	405	−36.6	62
8,000	27	345	−43.4	----	19	357	−38.4	----	29	373	−26.9	42	21	368	−30.1	55	28	365	−32.3	48	15	345	−45.5	----	26	350	−43.6	----
9,000	27	297	−48.7	----	13	309	−44.0	----	28	324	−34.4	44	20	319	−38.0	58	26	316	−39.5	----	6	296	−51.3	----	20	302	−49.2	----
10,000	25	255	−52.2	----	9	267	−49.6	----	28	280	−42.0	----	20	275	−45.7	----	26	273	−46.7	----	----	----	----	----	17	259	−53.8	----
11,000	16	219	−53.3	----	5	229	−53.3	----	19	242	−48.4	----	17	237	−51.9	----	15	235	−52.8	----	----	----	----	----	14	222	−54.9	----
12,000	9	188	−52.6	----	----	----	----	----	9	208	−53.4	----	11	203	−56.3	----	6	202	−57.0	----	----	----	----	----	14	189	−54.9	----
13,000	----	----	----	----	----	----	----	----	----	----	----	----	9	174	−57.7	----	----	----	----	----	----	----	----	----	11	162	−54.2	----
14,000	----	----	----	----	----	----	----	----	----	----	----	----	7	148	−60.3	----	----	----	----	----	----	----	----	----	10	139	−54.2	----
15,000	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	6	119	−55.0	----

Altitude (meters) m. s. l.	Brownsville, Tex. (6 m.)				Buffalo, N. Y. (221 m.)				Caribou, Maine (191 m.)				Charleston, S. C.[3] (14 m.)				Denver, Colo. (1,616 m.)				Dodge City, Kans. (787 m.)				El Paso, Tex. (1,195 m.)			
	Number of observations	Pressure	Temperature	Relative humidity	Number of observations	Pressure	Temperature	Relative humidity	Number of observations	Pressure	Temperature	Relative humidity	Number of observations	Pressure	Temperature	Relative humidity	Number of observations	Pressure	Temperature	Relative humidity	Number of observations	Pressure	Temperature	Relative humidity	Number of observations	Pressure	Temperature	Relative humidity
Surface	29	1,016	18.5	89	25	991	−5.1	78	29	990	−12.5	80	29	1,018	11.3	83	28	834	−0.5	65	29	925	1.5	76	28	881	9.4	50
500	29	959	17.4	79	25	957	−5.3	71	29	950	−12.4	76	29	961	12.3	72	----	----	----	----	----	----	----	----	----	----	----	----
1,000	29	904	15.8	58	25	898	−7.5	68	29	890	−13.9	75	29	905	10.8	69	----	----	----	----	29	901	2.9	67	----	----	----	----
1,500	29	853	14.8	42	25	841	−9.0	62	29	833	−14.1	65	29	852	8.7	62	----	----	----	----	29	847	2.2	59	28	849	10.6	39
2,000	29	803	13.1	33	25	788	−10.0	59	29	780	−15.4	62	29	802	7.2	57	28	795	−.4	57	29	796	1.1	48	28	799	7.6	39
2,500	29	757	10.9	32	25	739	−11.7	62	29	730	−16.8	56	29	754	4.8	52	28	747	−3.3	56	28	747	−1.0	43	28	752	4.0	42
3,000	29	713	8.5	29	25	692	−13.7	64	29	683	−18.4	54	29	710	2.5	45	28	700	−6.4	53	28	702	−3.8	40	28	707	.8	38
4,000	29	631	1.9	28	25	606	−18.4	58	29	596	−23.7	51	29	627	−2.7	42	28	616	−13.3	54	28	617	−10.1	35	28	623	−5.7	43
5,000	29	556	−4.8	29	25	529	−24.0	54	29	519	−29.0	48	28	552	−8.8	42	28	539	−20.5	53	28	542	−16.5	36	28	548	−12.3	37
6,000	29	489	−11.5	29	25	461	−30.4	52	29	450	−35.2	----	28	484	−15.4	41	28	471	−27.2	45	28	473	−23.5	36	28	480	−19.1	33
7,000	29	428	−19.2	35	25	399	−37.0	46	29	389	−41.8	----	28	424	−22.2	41	28	408	−34.8	48	28	412	−30.7	32	28	418	−26.1	40
8,000	28	374	−26.7	46	21	345	−44.1	----	27	335	−47.9	----	25	369	−29.6	42	24	354	−41.4	----	27	357	−38.2	----	28	363	−32.8	----
9,000	28	324	−34.3	47	19	296	−49.4	----	22	288	−50.3	----	24	320	−36.7	39	19	305	−48.1	----	17	309	−43.2	----	27	314	−40.2	----
10,000	27	281	−42.0	----	12	254	−52.3	----	20	248	−50.8	----	21	277	−43.7	----	13	260	−52.3	----	13	267	−50.4	----	21	272	−46.7	----
11,000	27	242	−49.1	----	10	218	−51.9	----	15	214	−50.2	----	11	238	−50.4	----	10	221	−52.7	----	11	228	−55.7	----	14	233	−52.8	----
12,000	21	208	−54.8	----	7	188	−51.3	----	12	183	−47.8	----	----	----	----	----	7	190	−50.8	----	9	194	−54.9	----	11	199	−54.7	----
13,000	9	178	−59.4	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	6	166	−54.0	----	6	168	−55.6	----

Altitude (meters) m. s. l.	Ely, Nev.[3] (1,908 m.)				Glasgow, Mont. (648 m.)				Great Falls, Mont. (1,128 m.)				Greensboro, N C. (273 m.)				Hatteras, N. C. (3 m.)				Huntington, W. Va. (172 m.)				International Falls, Minn. (343 m.)			
	Number of observations	Pressure	Temperature	Relative humidity	Number of observations	Pressure	Temperature	Relative humidity	Number of observations	Pressure	Temperature	Relative humidity	Number of observations	Pressure	Temperature	Relative humidity	Number of observations	Pressure	Temperature	Relative humidity	Number of observations	Pressure	Temperature	Relative humidity	Number of observations	Pressure	Temperature	Relative humidity
Surface	29	805	−4.3	78	29	939	−5.5	72	29	884	−4.1	60	27	987	3.9	79	29	1,019	8.5	84	29	990	3.2	75	29	976	−12.6	74
500	----	----	----	----	----	----	----	----	----	----	----	----	27	959	5.0	70	29	959	8.9	65	29	959	3.3	66	29	957	−12.1	70
1,000	----	----	----	----	29	898	−5.4	70	----	----	----	----	27	903	4.2	62	29	903	6.7	60	29	902	1.1	66	29	896	−13.5	70
1,500	----	----	----	----	29	842	−7.3	68	29	844	−4.3	64	27	849	2.8	56	29	850	4.8	53	29	848	−0.7	59	29	839	−13.7	63
2,000	29	796	−3.4	77	29	790	−9.3	63	29	791	−7.2	66	27	798	1.3	51	29	799	3.1	45	29	796	−2.5	54	29	785	−14.4	51
2,500	29	747	−5.3	75	29	740	−11.9	64	29	742	−10.1	70	27	750	−0.7	46	29	751	1.2	39	29	747	−4.2	53	29	735	−15.9	50
3,000	29	700	−8.7	74	29	693	−14.8	64	29	695	−13.0	68	27	704	−2.9	38	29	705	−1.1	40	29	701	−6.4	51	29	688	−18.2	50
4,000	29	614	−14.4	69	29	606	−20.4	63	29	608	−18.8	66	26	620	−8.0	40	29	621	−6.5	36	29	616	−10.9	42	29	601	−23.4	54
5,000	29	538	−20.5	65	29	529	−26.1	47	28	532	−24.8	67	26	544	−13.6	44	29	546	−12.2	35	28	540	−16.5	48	29	523	−28.9	51
6,000	29	470	−27.2	63	29	460	−32.4	47	28	463	−31.5	60	26	477	−20.3	50	29	478	−18.7	43	27	472	−22.5	52	29	454	−35.4	52
7,000	28	407	−34.9	61	29	398	−39.3	----	27	400	−39.2	----	26	416	−27.2	55	29	417	−25.6	48	27	411	−29.3	57	29	392	−42.2	----
8,000	26	352	−42.5	----	29	343	−47.2	----	26	345	−46.8	----	26	361	−34.2	54	29	363	−32.5	51	26	357	−36.1	62	22	339	−48.0	----
9,000	26	303	−49.0	----	29	294	−53.6	----	22	295	−53.7	----	25	312	−41.7	----	26	314	−39.8	----	25	308	−42.7	----	14	291	−52.6	----
10,000	25	260	−53.5	----	28	252	−55.5	----	18	252	−55.6	----	24	268	−49.0	----	25	271	−47.5	----	25	265	−48.9	----	9	248	−53.5	----
11,000	23	223	−55.2	----	25	216	−53.6	----	15	216	−54.5	----	24	230	−54.5	----	24	233	−53.8	----	21	228	−54.2	----	8	213	−50.6	----
12,000	21	190	−55.5	----	17	184	−50.5	----	14	185	−51.6	----	24	197	−56.9	----	20	199	−57.6	----	16	195	−55.8	----	----	----	----	----
13,000	19	163	−54.9	----	13	158	−49.7	----	13	158	−50.8	----	23	168	−58.2	----	20	169	−58.2	----	10	167	−55.4	----	----	----	----	----
14,000	16	139	−55.3	----	6	136	−51.1	----	9	136	−49.8	----	20	144	−60.3	----	13	144	−59.5	----	----	----	----	----	----	----	----	----
15,000	12	119	−57.0	----	----	----	----	----	5	117	−51.5	----	13	122	−62.3	----	10	123	−62.6	----	----	----	----	----	----	----	----	----
16,000	9	102	−57.9	----	----	----	----	----	----	----	----	----	8	104	−63.4	----	5	104	−65.2	----	----	----	----	----	----	----	----	----
17,000	6	88	−60.3	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----

TABLE 1.—*Mean free-air barometric pressure in millibars, temperature in degrees centigrade, and relative humidities in percent, obtained by radiosondes during February 1944*—Continued

Altitude (meters) m. s. l.	Joliet, Ill. (178 m.)				Lake Charles, La. (5 m.)				Lakehurst, N. J.[1] (39 m.)				Little Rock, Ark. (79 m.)				Louisville, Ky. (166 m.)				Mazatlan, Mexico (80 m.)				Medford, Oreg.[2] (409 m.)			
	Number of observations	Pressure	Temperature	Relative humidity	Number of observations	Pressure	Temperature	Relative humidity	Number of observations	Pressure	Temperature	Relative humidity	Number of observations	Pressure	Temperature	Relative humidity	Number of observations	Pressure	Temperature	Relative humidity	Number of observations	Pressure	Temperature	Relative humidity	Number of observations	Pressure	Temperature	Relative humidity
Surface	29	997	−3.5	87	29	1,018	14.8	88	24	1,013	−1.2	67	29	1,009	8.7	82	29	999	4.2	70	21	1,008	19.5	83	29	968	5.7	76
500	29	957	−2.5	75	29	960	14.2	78	24	956	−1.3	71	29	959	8.2	71	29	959	4.0	67	21	960	20.2	58	29	957	5.7	74
1,000	29	899	−3.2	66	29	905	12.7	65	24	898	−3.5	69	29	903	7.3	63	29	902	2.3	63	21	905	18.9	45	29	900	3.2	75
1,500	29	844	−3.8	57	29	853	11.4	52	24	842	−4.6	56	29	850	6.3	53	29	848	0.9	56	21	854	16.5	37	29	846	−0.2	79
2,000	29	792	−5.7	51	29	803	9.4	50	24	790	−6.1	55	29	799	4.8	51	29	796	−0.3	49	21	805	13.4	37	29	794	−3.2	78
2,500	29	742	−8.0	50	29	756	7.0	47	23	742	−7.1	55	29	751	2.9	50	29	748	−2.4	48	21	758	9.9	40	29	745	−6.3	75
3,000	29	696	−9.7	44	29	711	5.1	41	23	696	−9.4	59	29	706	0.6	52	29	702	−4.7	45	21	714	6.9	39	29	699	−9.1	73
4,000	28	611	−15.3	46	29	629	−0.3	32	21	610	−15.0	53	28	623	−5.3	48	29	617	−9.6	45	20	631	1.1	39	29	613	−14.8	67
5,000	28	535	−20.8	46	29	554	−7.3	31	19	535	−20.7	51	27	548	−12.0	48	29	542	−15.3	46	19	557	−5.0	40	28	537	−21.6	59
6,000	28	466	−27.5	47	29	486	−14.4	37	19	466	−27.1	56	26	480	−18.3	52	29	474	−21.8	46	18	489	−11.7	44	28	468	−28.4	57
7,000	27	405	−34.2	47	29	426	−21.5	46	18	405	−34.0	68	26	419	−25.3	51	29	413	−28.4	51	18	429	−18.4	47	27	406	−35.2	50
8,000	25	350	−40.6		29	371	−28.7	56	17	350	−40.7		25	364	−32.7	48	24	359	−34.9		18	374	−25.9	47	27	351	−42.3	
9,000	23	302	−46.9		29	322	−35.9	56	16	301	−47.1		24	315	−39.9		16	311	−41.1		17	325	−33.3	57	26	303	−47.8	
10,000	19	260	−51.8		27	278	−43.5		14	258	−53.1		19	271	−47.4						16	282	−41.0		24	259	−52.4	
11,000	12	224	−54.0		25	240	−49.6		10	221	−56.1		14	234	−53.2						13	243	−48.5		23	222	−55.4	
12,000	9	191	−53.4		22	205	−55.2		8	187	−56.1										12	208	−54.9		21	190	−56.5	
13,000	6	164	−52.8		18	175	−59.5		6	159	−57.0										12	178	−60.0		21	162	−55.4	
14,000					12	149	−61.4		5	137	−57.1										10	152	−62.1		15	139	−55.0	
15,000									5	117	−57.2										9	129	−66.1		9	118	−54.4	
16,000																					8	109	−70.0		7	101	−54.9	
17,000																					6	92	−71.1					

Altitude (meters) m. s. l.	Miami, Fla.[3] (4 m.)				Nashville, Tenn. (180 m.)				Norfolk, Va.[1] (4 m.)				Oakland, Calif. (2 m.)				Ogden, Utah (1,355 m.)				Oklahoma City, Okla. (391 m.)				Omaha, Nebr. (301 m.)			
	Number of observations	Pressure	Temperature	Relative humidity	Number of observations	Pressure	Temperature	Relative humidity	Number of observations	Pressure	Temperature	Relative humidity	Number of observations	Pressure	Temperature	Relative humidity	Number of observations	Pressure	Temperature	Relative humidity	Number of observations	Pressure	Temperature	Relative humidity	Number of observations	Pressure	Temperature	Relative humidity
Surface	29	1,020	19.2	86	28	998	7.8	75	19	1,017	6.1	73	29	1,016	10.5	75	29	863	−2.2	80	27	972	6.1	79	29	983	−1.7	79
500	29	963	18.5	80	28	960	7.2	69	19	957	4.3	59	29	956	7.6	67					27	959	6.4	75	29	959	−2.2	73
1,000	29	909	15.5	76	28	903	4.7	68	19	900	2.3	55	29	900	4.9	62					27	902	5.2	69	29	901	−2.5	63
1,500	29	857	12.7	73	28	849	3.9	57	19	846	1.2	57	29	846	2.1	63	29	848	−1.5	73	27	849	4.7	60	29	845	−2.8	56
2,000	29	807	11.2	56	28	798	2.8	46	19	794	−1.8	57	29	795	−0.6	54	29	796	−3.0	65	27	798	3.6	53	29	793	−4.7	54
2,500	28	760	10.1	42	28	750	1.3	41	17	745	−4.6	45	29	746	−3.2	50	29	746	−6.7	72	27	750	1.7	46	29	745	−7.1	53
3,000	28	715	8.1	38	28	705	−1.0	38	17	699	−6.7	45	29	700	−6.0	50	29	700	−10.1	76	27	705	−0.7	40	29	698	−9.2	53
4,000	27	633	2.7	32	24	622	−6.6	37	17	615	−12.0	42	29	616	−12.1	43	29	614	−15.7	67	26	621	−6.7	35	29	613	−15.4	52
5,000	26	559	−3.4	27	24	546	−12.3	48	14	539	−17.1	38	29	539	−18.7	35	29	537	−21.7	61	25	546	−13.1	33	28	536	−21.8	50
6,000	26	492	−10.1	26	21	479	−18.3	53	14	471	−23.9	33	28	471	−25.9	36	29	468	−28.6	58	24	478	−20.2	38	28	467	−28.2	49
7,000	26	431	−17.3	26	21	418	−25.3	54	13	409	−31.1	43	28	409	−33.4		29	406	−35.7	48	24	417	−27.2	44	27	405	−35.3	46
8,000	26	376	−24.7	26	21	363	−32.3	52	5	355	−35.5		27	354	−40.8		29	351	−43.3		22	362	−33.9		27	350	−42.9	
9,000	26	327	−32.3	26	20	314	−39.6		5	307	−42.1		26	305	−46.8		29	302	−50.2		21	313	−40.8		25	301	−48.7	
10,000	25	284	−39.3		14	273	−45.8						25	262	−52.2		29	258	−54.6		19	270	−47.5		23	259	−51.6	
11,000	24	244	−46.4		9	235	−53.2						18	225	−56.1		29	222	−56.0		15	232	−54.1		18	222	−53.6	
12,000	19	210	−53.0										15	193	−58.2		28	189	−56.2		8	199	−56.8		13	190	−53.0	
13,000	15	179	−58.7										13	166	−57.6		25	162	−54.8						8	164	−53.6	
14,000	9	152	−63.0										9	142	−58.9		22	138	−54.2									
15,000	9	129	−66.8										6	122	−61.4		14	118	−55.0									
16,000	6	110	−70.9														12	101	−56.2									

Altitude (meters) m. s. l.	Phoenix, Ariz. (339 m.)				Pittsburgh, Pa. (392 m.)				Portland, Maine[3] (20 m.)				Rapid City, S. Dak. (981 m.)				St. Louis, Mo. (171 m.)				St. Paul, Minn. (225 m.)				San Antonio, Tex. (242 m.)			
	Number of observations	Pressure	Temperature	Relative humidity	Number of observations	Pressure	Temperature	Relative humidity	Number of observations	Pressure	Temperature	Relative humidity	Number of observations	Pressure	Temperature	Relative humidity	Number of observations	Pressure	Temperature	Relative humidity	Number of observations	Pressure	Temperature	Relative humidity	Number of observations	Pressure	Temperature	Relative humidity
Surface	29	975	10.7	66	29	970	−0.1	74	28	1,013	−6.3	77	28	902	−6.0	83	29	999	2.4	73	29	992	−5.8	75	28	989	13.6	84
500	29	957	12.7	51	29	957	−0.2	72	28	953	−6.7	76					29	959	2.0	65	29	957	−6.5	71	28	959	14.0	79
1,000	29	901	9.9	48	29	899	−1.6	67	28	894	−8.8	76	28	899	−5.7	82	29	901	1.0	53	29	897	−7.7	69	28	904	12.8	72
1,500	29	848	6.2	53	29	844	−3.2	60	28	838	−10.2	77	28	844	−4.1	63	29	847	0.4	42	29	842	−7.9	58	28	852	11.6	64
2,000	29	798	2.4	58	29	792	−4.8	56	28	785	−11.4	75	28	792	−6.4	61	29	795	−0.6	41	29	789	−8.7	54	28	802	10.4	48
2,500	29	749	−0.9	56	29	743	−6.5	56	28	735	−12.7	72	28	743	−9.0	61	29	747	−2.6	44	28	740	−11.3	50	28	755	8.4	40
3,000	29	704	−3.6	48	29	697	−8.7	54	28	688	−14.2	67	28	696	−12.0	65	29	701	−4.7	47	28	693	−13.9	46	28	710	6.1	30
4,000	29	619	−9.3	40	29	612	−13.5	51	27	603	−19.0	62	28	610	−18.0	61	28	617	−10.5	49	28	606	−19.6	42	28	628	−0.3	31
5,000	29	544	−16.0	32	29	536	−18.9	46	27	527	−24.6	61	28	533	−24.3	57	28	541	−16.3	43	27	530	−25.6	40	28	554	−7.4	37
6,000	29	475	−22.8	30	29	468	−25.0	44	26	458	−31.2	62	28	464	−31.1	56	27	474	−22.7	41	27	461	−31.9	39	28	486	−14.0	37
7,000	29	414	−30.3	35	29	407	−31.7	49	25	397	−37.7	61	28	401	−38.6	50	27	412	−30.0	41	27	399	−38.7	43	28	426	−21.3	48
8,000	29	359	−36.9		29	353	−37.7	51	23	343	−43.8		24	347	−45.7		23	358	−36.5		24	345	−44.8		28	370	−28.5	55
9,000	29	309	−43.6		26	305	−43.8		21	295	−48.8		18	299	−50.9		18	310	−42.7		15	298	−49.5		28	321	−35.6	41
10,000	29	266	−49.8		19	263	−49.9		17	254	−51.7		13	257	−54.3		9	268	−48.3		5	254	−50.3		27	278	−43.4	
11,000	28	229	−54.2		6	226	−54.6		7	221	−52.9		5	222	−58.3										20	240	−50.4	
12,000	27	196	−55.0																						7	206	−55.3	
13,000	26	167	−55.3																									
14,000	23	142	−56.8																									
15,000	20	122	−59.3																									
16,000	18	104	−61.0																									
17,000	13	88	−62.9																									
18,000	7	76	−63.3																									

TABLE 1.—*Mean free-air barometric pressure in millibars, temperature in degrees centigrade, and relative humidities in percent, obtained by radiosondes during February 1944*—Continued

Altitude (meters) m. s. l.	San Diego, Calif.[1] (19 m.)				San Juan, P. R. (15 m.)				Santa Maria, Calif. (73 m.)				Saulte Ste. Marie, Mich.[2] (221 m.)				Seattle, Wash.[1] (22 m.)				Spokane, Wash. (598 m.)				Swan Island, West Indies (10 m.)			
	Number of observations	Pressure	Temperature	Relative humidity	Number of observations	Pressure	Temperature	Relative humidity	Number of observations	Pressure	Temperature	Relative humidity	Number of observations	Pressure	Temperature	Relative humidity	Number of observations	Pressure	Temperature	Relative humidity	Number of observations	Pressure	Temperature	Relative humidity	Number of observations	Pressure	Temperature	Relative humidity
Surface	22	1,014	12.9	77	29	1,017	23.8	76	28	1,008	10.2	79	24	990	−7.7	84	16	1,014	6.6	76	29	945	0.2	81	29	1,016	24.5	78
500	22	957	9.9	77	29	962	19.7	79	28	957	8.7	68	24	956	−8.2	84	16	956	3.4	75					29	960	21.1	81
1,000	20	901	7.2	66	29	908	16.2	73	28	901	6.0	60	24	896	−10.6	83	16	899	−0.3	77	29	899	−0.5	70	29	906	17.7	76
1,500	20	848	4.0	62	29	856	13.3	63	28	847	3.2	59	24	839	−12.6	84	16	844	−3.4	75	29	844	−3.6	69	29	855	14.5	65
2,000	20	797	0.8	63	29	806	11.1	51	28	796	0.4	53	24	785	−14.2	81	16	792	−6.6	71	29	792	−6.9	73	29	805	12.5	45
2,500	20	749	−0.9	55	29	759	9.3	39	28	748	−1.8	45	24	735	−15.4	79	16	742	−9.3	73	29	743	−10.1	77	29	759	11.3	24
3,000	20	703	−3.4	45	29	714	7.7	23	28	702	−4.2	41	24	688	−17.0	74	16	696	−12.2	74	29	696	−12.6	76	29	714	9.8	
4,000	19	618	−9.0		27	633	3.5		28	617	−9.5	30	22	602	−21.5	67	16	610	−17.8	74	29	609	−18.3	70	28	633	4.8	
5,000	17	543	−15.8		27	558	−2.5		28	542	−16.2	35	22	524	−27.2	64	15	532	−24.6	74	29	533	−24.2	65	28	559	−0.9	
6,000	17	474	−23.5		27	491	−9.1		28	474	−23.5	37	21	457	−33.0	60	12	463	−31.6	74	29	464	−30.5	65	28	492	−7.8	
7,000	17	413	−30.2		26	431	−16.3		28	412	−31.2		20	395	−39.7	49	10	403	−37.7		29	402	−37.8	58	26	432	−14.4	
8,000	10	359	−36.4		24	377	−23.5		26	359	−37.9		19	341	−46.1		8	348	−45.4		25	346	−45.3		26	378	−22.0	
9,000	10	310	−43.0		24	328	−30.8		25	309	−44.5		18	294	−51.6		7	298	−50.8		22	297	−51.5		26	329	−28.7	
10,000	8	268	−48.8		24	284	−37.5		23	266	−51.1		13	252	−55.1		5	253	−55.0		21	255	−55.8		25	286	−35.9	
11,000	6	230	−55.0		24	245	−44.5		22	229	−55.6		9	218	−55.6		5	217	−56.6		14	217	−54.8		24	247	−43.7	
12,000					21	210	−51.1		16	196	−58.1		8	185	−53.8						11	186	−52.4		24	212	−51.4	
13,000					18	180	−57.6		14	168	−56.1										10	159	−51.3		23	181	−58.5	
14,000					17	153	−63.6		11	144	−57.3										10	137	−51.7		23	154	−64.7	
15,000					14	130	−69.8		9	123	−59.7										5	117	−52.4		21	131	−70.1	
16,000					11	110	−74.9		8	105	−60.7														21	110	−75.0	
17,000					7	93	−77.3		5	90	−63.2														17	93	−78.2	
18,000																									14	78	−78.5	
19,000																									12	66	−76.6	

Altitude (meters) m. s. l.	Tacubaya, Mexico (2,306 m.)				Tampa, Fla. (3 m.)				Tapachula, Mexico (115 m.)				Tatoosh Island, Wash. (31 m.)				Toledo, Ohio (191 m.)				Tongue Point, Oreg.[1] (21 m.)				Washington, D. C. (25 m.)			
	Number of observations	Pressure	Temperature	Relative humidity	Number of observations	Pressure	Temperature	Relative humidity	Number of observations	Pressure	Temperature	Relative humidity	Number of observations	Pressure	Temperature	Relative humidity	Number of observations	Pressure	Temperature	Relative humidity	Number of observations	Pressure	Temperature	Relative humidity	Number of observations	Pressure	Temperature	Relative humidity
Surface	29	774	16.4	43	28	1,021	17.6	87	29	909	25.0	77	29	1,012	6.4	79	28	996	−2.9	84	17	1,014	7.4	76	29	1,016	2.9	66
500					28	963	17.5	60	29	956	23.8	62	29	956	4.1	70	28	957	−2.3	73	17	956	3.9	75	29	958	1.2	61
1,000					28	909	14.8	56	29	903	21.1	62	29	899	1.0	67	28	899	−4.7	73	17	899	0.4	74	29	900	−0.1	60
1,500					28	857	12.6	51	29	852	18.0	70	29	844	−2.1	59	28	844	−5.4	64	17	845	−3.1	71	29	846	−1.4	54
2,000					28	806	10.4	43	29	803	15.1	71	29	793	−4.7	53	28	791	−6.9	61	17	793	−5.4	56	29	794	−3.5	56
2,500	29	756	15.6	43	28	759	8.9	27	29	757	12.7	66	29	744	−7.0	47	28	742	−8.8	58	17	743	−8.0	55	29	745	−5.3	52
3,000	29	713	12.5	44	28	715	6.8	23	29	713	10.2	56	29	697	−9.7	41	28	695	−10.6	52	17	697	−10.8	50	29	699	−6.9	47
4,000	29	632	4.6	55	28	632	1.7	20	29	632	4.5	43	28	611	−16.1	45	28	610	−15.4	49	17	611	−17.3	51	29	614	−12.2	44
5,000	29	558	−2.7	55	27	557	−4.4	20	28	559	0.5		27	535	−22.6	52	28	534	−21.5	44	17	534	−24.3	56	29	538	−17.9	41
6,000	29	491	−8.6	26	27	490	−11.1	23	28	492	−5.7		27	466	−29.5	51	28	465	−28.0	46	15	465	−31.5	58	29	470	−23.8	45
7,000	29	431	−15.6	23	27	429	−18.2	24	28	433	−13.3		27	404	−36.3	47	28	403	−34.8	47	12	404	−36.4		29	409	−30.4	51
8,000	27	377	−23.4	31	27	375	−25.5	31	28	378	−21.2		27	349	−43.8		28	349	−41.4		5	346	−44.2		29	355	−37.0	58
9,000	27	327	−30.9	38	27	325	−33.0		28	329	−29.0		27	300	−49.4		24	300	−46.9		5	297	−48.5		27	307	−43.6	
10,000	27	284	−38.1		27	282	−40.6		28	286	−36.6		23	258	−54.1		20	258	−51.2		5	255	−52.2		23	265	−50.5	
11,000	27	245	−45.7		26	243	−47.5		28	247	−43.9		22	221	−56.6		17	220	−53.9						22	226	−56.1	
12,000	18	210	−52.3		20	208	−54.2		26	212	−50.7		22	188	−55.1		11	188	−53.2						19	193	−56.8	
13,000					15	177	−60.4		18	182	−57.9		20	161	−53.6		8	160	−51.9						14	164	−56.8	
14,000					12	150	−64.8		13	155	−65.1		20	138	−53.8													
15,000					11	127	−68.2						10	118	−53.9													
16,000					10	108	−71.7						8	101	−54.0													
17,000					7	91	−74.4						6	86	−53.9													

[1] U. S. Navy.
[2] Humidity data obtained by hair hygrometer, others using electric hygrometer.

All observations were taken near 11 p. m., E. S. T.

"Number of observations" refers to pressure only, as temperature and humidity data are sometimes missing for some observations at certain levels. Relative humidity data are not used in daily observations when the temperature is below −40° C.

None of the means included in these tables are based on less than 15 surface or 5 standard-level observations.

Means for observations obtained by the electric hygrometer have been adjusted to compensate for the values occurring below the operating range of the humidity element.

TABLE 2.—*Free-air resultant winds based on pilot-balloon observations made near 5 p. m. (75th meridian time) during March, 1944. Directions given in degrees from North (N=360°, E=90°, S=180°, W=270°) (velocities in meters per second)*

Altitude (meters) m. s. l.	Abilene, Tex. (538 m.)			Albuquerque, N. Mex. (1,630 m.)			Atlanta, Ga. (299 m.)			Billings, Mont. (1,095 m.)			Bismarck, N. Dak. (512 m.)			Boise, Idaho (870 m.)			Brownsville, Tex. (7 m.)		
	Observations	Direction	Velocity	Observations	Direction	Velocity	Observations	Direction	Velocity	Observations	Direction	Velocity	Observations	Direction	Velocity	Observations	Direction	Velocity	Observations	Direction	Velocity
Surface	30	225	2.8	30	279	3.8	26	258	2.9	31	294	3.6	30	321	3.5	31	312	4.6	31	120	4.7
500	---	---	---	---	---	---	26	262	4.1	---	---	---	---	---	---	---	---	---	31	145	4.5
1,000	29	223	4.4	---	---	---	26	263	4.7	---	---	---	29	317	5.3	31	307	5.1	20	160	0.4
1,500	27	240	5.7	---	---	---	25	268	6.0	31	291	5.2	22	305	7.2	31	306	5.7	17	286	1.4
2,000	25	244	7.2	30	283	5.1	23	275	6.4	28	298	6.7	16	300	7.5	30	301	6.4	14	258	4.4
2,500	21	257	9.6	30	284	5.3	20	278	11.2	26	299	9.1	15	303	9.0	26	310	7.0	13	249	6.1
3,000	21	256	12.2	29	282	7.0	19	281	14.1	21	297	10.7	13	303	12.0	25	317	7.2	11	240	10.7
4,000	20	262	17.4	25	277	10.2	15	273	16.9	14	303	12.1	10	311	13.3	18	327	10.9	10	239	16.6
5,000	19	255	19.7	22	284	14.2	13	263	23.0	---	---	---	---	---	---	16	328	14.9	---	---	---
6,000	15	253	21.8	14	281	16.3	11	265	25.4	---	---	---	---	---	---	15	332	13.6	---	---	---
8,000	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---

Altitude (meters) m. s. l.	Buffalo, N. Y. (220 m.)			Burlington, Vt. (132 m.)			Charleston, S. C. (17 m.)			Cincinnati, Ohio (152 m.)			Denver, Colo. (1,627 m.)			El Paso Tex. (1,196 m.)		
	Observations	Direction	Velocity	Observations	Direction	Velocity	Observations	Direction	Velocity	Observations	Direction	Velocity	Observations	Direction	Velocity	Observations	Direction	Velocity
Surface	27	229	2.5	30	279	1.6	27	235	1.3	29	269	1.8	29	5	2.4	31	259	4.3
500	27	229	3.5	30	249	2.8	27	237	3.6	29	244	3.3	---	---	---	---	---	---
1,000	24	229	6.1	27	268	4.8	27	261	5.3	24	223	4.7	---	---	---	---	---	---
1,500	23	247	6.1	25	286	7.0	23	267	7.3	20	236	8.7	---	---	---	31	256	6.3
2,000	18	278	7.1	21	295	9.7	22	273	11.3	14	243	10.1	29	337	3.1	31	261	7.8
2,500	15	289	9.0	15	291	11.6	19	276	14.4	11	255	10.7	25	302	3.9	31	260	7.2
3,000	13	281	13.0	---	---	---	17	273	15.5	---	---	---	21	284	6.9	31	261	9.0
4,000	---	---	---	---	---	---	13	287	16.8	---	---	---	18	296	9.0	30	262	13.4
5,000	---	---	---	---	---	---	13	284	20.9	---	---	---	16	296	13.1	24	261	14.6
6,000	---	---	---	---	---	---	12	284	20.3	---	---	---	15	290	15.0	18	268	17.6
8,000	---	---	---	---	---	---	---	---	---	---	---	---	11	273	23.0	---	---	---

Altitude (meters) m. s. l.	Ely, Nev. Nev. (1,910 m.)			Grand Junction, (1,413 m.) Colo.			Greensboro, N. C. (271 m.)			Havre, Mont. (767 m.)			Jacksonville, Fla. (16 m.)			Joliet, Ill. (178 m.)			Las Vegas, Nev. (573 m.)		
	Observations	Direction	Velocity	Observations	Direction	Velocity	Observations	Direction	Velocity	Observations	Direction	Velocity	Observations	Direction	Velocity	Observations	Direction	Velocity	Observations	Direction	Velocity
Surface	29	316	2.9	30	273	1.9	24	238	2.4	30	296	2.0	30	127	1.2	26	255	2.1	31	70	0.9
500	---	---	---	---	---	---	24	232	4.5	---	---	---	30	240	2.3	26	261	2.4	---	---	---
1,000	---	---	---	---	---	---	24	239	5.3	30	294	3.2	29	244	4.4	20	236	3.6	31	10	0.9
1,500	---	---	---	30	273	2.3	24	262	7.0	29	293	5.8	26	250	6.5	19	246	4.5	31	303	1.8
2,000	29	312	3.0	30	277	3.4	22	272	10.7	22	298	9.3	23	265	6.8	15	248	7.2	29	317	3.8
2,500	29	312	3.7	30	266	4.3	21	273	13.8	19	299	12.0	20	271	8.1	10	258	9.5	28	323	4.8
3,000	28	317	4.1	28	264	4.6	20	275	16.3	17	301	13.3	16	267	9.7	---	---	---	27	325	6.1
4,000	21	333	9.9	17	297	8.0	18	270	20.3	---	---	---	15	266	13.7	---	---	---	25	324	9.6
5,000	18	327	13.5	---	---	---	14	280	20.5	---	---	---	14	269	15.3	---	---	---	24	326	14.4
6,000	18	323	16.3	---	---	---	---	---	---	---	---	---	12	266	15.9	---	---	---	22	324	18.4
8,000	16	325	20.2	---	---	---	---	---	---	---	---	---	10	270	22.1	---	---	---	14	335	18.1
																			10	324	21.9

Altitude (meters) m. s. l.	Little Rock, Ark. (88 m.)			Medford, Oreg. (410 m.)			Miami, Fla. (15 m.)			Mobile, Ala. (66 m.)			Nashville, Tenn. (194 m.)			New York, N. Y. (15 m.)		
	Observations	Direction	Velocity	Observations	Direction	Velocity	Observations	Direction	Velocity	Observations	Direction	Velocity	Observations	Direction	Velocity	Observations	Direction	Velocity
Surface	28	181	0.5	29	321	1.5	31	146	3.2	28	205	0.7	29	250	1.7	28	295	2.3
500	28	179	1.6	29	321	1.7	31	140	3.4	28	207	1.8	29	244	3.2	28	281	3.4
1,000	26	224	3.2	29	304	1.3	28	153	3.6	22	244	2.3	26	241	5.6	25	282	6.5
1,500	25	252	6.3	29	295	1.6	25	187	2.0	20	261	4.7	24	241	6.7	25	289	9.1
2,000	24	254	9.1	28	323	2.7	20	216	3.1	19	273	7.0	21	256	9.3	20	291	10.6
2,500	21	256	11.6	24	347	3.6	16	242	4.9	17	275	9.0	20	266	13.2	16	291	11.0
3,000	18	266	15.4	22	342	6.3	13	243	5.2	11	267	8.1	16	271	15.6	13	299	13.4
4,000	14	272	18.6	17	337	13.5	10	255	5.0	---	---	---	14	265	17.5	---	---	---
5,000	13	268	21.4	14	335	14.4	11	250	6.6	---	---	---	12	266	21.6	---	---	---
6,000	---	---	---	11	338	16.6	11	258	10.2	---	---	---	11	264	24.3	---	---	---
8,000	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---

Altitude (meters) m. s. l.	Oakland, Calif. (8 m.)			Oklahoma City, Okla. (402 m.)			Omaha, Nebr. (306 m.)			Phoenix, Ariz. (338 m.)			Rapid City S. Dak. (982 m.)			St. Louis, Mo. (181 m.)			St. Paul, Minn. (225 m.)		
	Observations	Direction	Velocity	Observations	Direction	Velocity	Observations	Direction	Velocity	Observations	Direction	Velocity	Observations	Direction	Velocity	Observations	Direction	Velocity	Observations	Direction	Velocity
Surface	31	285	2.5	26	193	4.0	24	299	3.1	31	288	1.2	23	357	5.7	28	266	1.3	28	281	2.0
500	31	323	2.6	26	196	4.0	24	298	2.9	31	256	1.9	---	---	---	28	253	3.0	28	271	1.8
1,000	30	347	5.2	26	208	5.2	20	289	2.7	31	251	1.8	23	352	5.7	24	246	5.8	21	246	3.2
1,500	29	346	6.5	22	249	6.4	17	274	3.8	31	253	2.3	23	316	7.8	20	253	8.4	18	261	5.3
2,000	29	342	7.3	19	267	10.7	13	265	7.5	31	249	2.8	22	306	9.6	17	271	10.2	13	261	6.9
2,500	28	347	9.3	18	268	12.9	13	273	9.8	30	262	3.0	21	299	9.8	14	273	12.7	---	---	---
3,000	28	346	9.0	17	267	15.7	---	---	---	29	282	4.3	17	296	12.6	13	273	15.8	---	---	---
4,000	26	333	11.7	15	265	18.6	---	---	---	25	288	7.2	11	299	13.9	12	266	20.4	---	---	---
5,000	22	335	13.3	14	269	23.6	---	---	---	23	296	9.7	---	---	---	---	---	---	---	---	---
6,000	19	335	12.5	11	265	27.8	---	---	---	21	301	12.3	---	---	---	---	---	---	---	---	---
8,000	12	319	16.1	---	---	---	---	---	---	15	304	13.4	---	---	---	---	---	---	---	---	---

Altitude (meters) m. s. l.	San Antonio, Tex. (240 m.)			San Diego, Calif. (15 m.)			Sault Ste. Marie, Mich. (225 m.)			Seattle, Wash. (12 m.)			Spokane, Wash. (603 m.)			Washington, D. C. (24 m.)		
	Observations	Direction	Velocity	Observations	Direction	Velocity	Observations	Direction	Velocity	Observations	Direction	Velocity	Observations	Direction	Velocity	Observations	Direction	Velocity
Surface	30	144	1.3	31	259	2.8	25	274	1.3	30	282	1.7	31	269	2.4	24	297	2.1
500	30	143	1.5	31	276	2.2	25	252	1.1	30	236	1.1	---	---	---	24	265	2.6
1,000	27	193	2.1	26	343	1.1	21	223	3.1	28	231	2.2	31	271	3.8	24	275	4.7
1,500	22	226	3.8	25	19	2.7	17	256	4.1	25	258	2.9	31	269	4.7	24	270	6.2
2,000	21	246	6.5	25	3	3.7	15	283	4.1	20	292	4.0	28	283	5.2	23	277	10.2
2,500	17	259	8.8	24	350	4.9	11	296	5.6	19	294	5.8	23	308	6.8	21	282	13.4
3,000	16	261	9.7	21	348	6.2	10	298	7.2	15	314	7.9	19	306	6.9	20	275	15.7
4,000	12	259	14.5	19	330	8.7	---	---	---	---	---	---	13	314	11.1	17	280	19.4
5,000	11	255	18.8	18	331	9.6	---	---	---	---	---	---	---	---	---	13	278	24.0
6,000	10	261	21.9	11	329	11.1	---	---	---	---	---	---	---	---	---	---	---	---
8,000	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---

TABLE 3.—*Maximum free-air wind velocities (m. p. s.) for different sections of the United States, based on pilot-balloon observations during March 1944*

Section	Surface to 2,500 meters (m. s. l.)					Above 2,500 to 5,000 meters (m. s. l.)					Above 5,000 meters (m. s. l.)				
	Maximum velocity	Direction	Altitude (m) m. s. l.	Date	Station	Maximum velocity	Direction	Altitude (m) m. s. l.	Date	Station	Maximum velocity	Direction	Altitude (m) m. s. l.	Date	Station
Northeast [1]	43.2	WSW	2,085	8	New York, N. Y.	50.4	WNW	4,432	26	Portland, Maine	73.6	NW	10,640	14	Mount Washington, N. H.
East-Central [2]	40.8	WSW	2,437	8	Hatteras, N. C.	66.0	WNW	4,438	8	Chattanooga, Tenn.	74.0	WSW	11,324	24	Washington, D. C.
Southeast [3]	35.6	SW	1,908	19	Birmingham, Ala.	54.4	WSW	5,000	7	Atlanta, Ga.	60.2	WSW	5,244	7	Atlanta, Ga.
North-Central [4]	38.6	W	730	6	Milwaukee, Wis.	45.9	W	5,000	10	Williston, N. Dak.	60.8	W	7,695	28	Sault Ste. Marie, Mich.
Central [5]	43.4	NW	951	6	Sioux City, Iowa	46.0	NW	4,024	----	Omaha, Nebr.	56.8	WNW	9,715	4	Wichita, Kans.
								4,574	8		56.8	WSW	7,546	18	Omaha, Nebr.
South-Central [6]	40.0	WSW	1,253	4	Memphis, Tenn.	44.5	NNE	2,518	8	Little Rock, Ark.	64.0	W	10,142	30	Brownsville, Tex.
Northwest [7]	40.6	WNW	1,881	10	Ellensburg, Wash.	64.2	W	4,221	23	Ellensburg, Wash.	84.0	N	6,711	13	Medford, Oreg.
West-Central [8]	37.4	W	2,489	23	Cheyenne, Wyo.	59.3	N	5,000	13	Redding, Calif.	69.0	N	6,514	13	Redding, Calif.
Southwest [9]	37.0	W	2,098	5	Roswell, N. Mex.	50.8	SSE	4,983	2	Las Vegas, Nev.	67.0	SW	9,545	2	Albuquerque, N. Mex.

[1] Maine, Vermont, New Hampshire, Massachusetts, Rhode Island, Connecticut, New York, New Jersey, Pennsylvania, and northern Ohio.
[2] Delaware, Maryland, Virginia, West Virginia, southern Ohio, Kentucky, eastern Tennessee, and North Carolina.
[3] South Carolina, Georgia, Florida, and Alabama.
[4] Michigan, Wisconsin, Minnesota, North Dakota, and South Dakota.
[5] Indiana, Illinois, Iowa, Nebraska, Kansas, and Missouri.
[6] Mississippi, Arkansas, Louisiana, Oklahoma, Texas (except El Paso), and western Tennessee.
[7] Montana, Idaho, Washington, and Oregon.
[8] Wyoming, Colorado, Utah, northern Nevada, and northern California.
[9] Southern California, southern Nevada, Arizona, New Mexico, and extreme west Texas.

RIVER STAGES AND FLOODS

By C. R. JORDAN

PRECIPITATION during March was abnormally heavy from the Rocky Mountains eastward, except in a few relatively small areas. Amounts were unusually heavy in the Atlantic area, especially in southern sections, the Central and East Gulf and central Rocky Mountain States, and in a belt extending from central Kansas and northern Oklahoma northeastward to the Lakes region. Southeastern South Carolina and Georgia received three times the March normals. Amounts were considerably below normal in the Southwest, especially western Texas and eastern New Mexico, and also in the Pacific States.

The southern edge of the snow cover retreated considerably during March and by the end of the month most ground in the United States was bare of snow. The ground was still covered in northern New England, the northern Lakes region and over most of Wisconsin and North Dakota. Considerable depths also remained in the higher elevations of the West.

Stream flow continued high in the Southeast and in the South Central States and was above normal over the eastern half of the country with the exception of New England and northern Michigan and Wisconsin. Stream flow continued sub-normal throughout the West except in Nevada and western Arizona. Floods in the southeastern States were the only overflow of consequence in the United States during the month and, in fact, since October 1943. In response to heavy rainfall late in February and frequently during March, especially during the latter part of the month, more-than-seasonal rises in stream flow occurred in an area extending from eastern Texas and Kansas to Virginia. Flood records of 50-years standing were broken in the Tombigbee River Basin in Mississippi, many long-standing deficiencies in reservoir storage, especially in Oklahoma, were made up during the month and light flooding occurred at scattered points throughout the country, east of the Divide.

Atlantic Slope Drainage.—Moderate rain near the middle of March combined with some snow melt produced a rise in the headwater tributaries of the Susquehanna River and bankful stages were reached and exceeded slightly at a number of locations north of the Pennsylvania line. Bankful stages were also approached but not reached in the North and West Branches of the Susquehanna in Pennsylvania.

Moderate to heavy rainfall late in February and frequently during March caused a succession of rises in the Atlantic coastal streams from Virginia to southern Georgia, and light to moderate flooding occurred at intervals on all streams. No long time records for the area were broken. A number of crests were recorded at the upstream stations but the rainfall occurred at such intervals that runoff from previous rains on the larger streams had not been dissipated before the effect of later rains was felt and the slowly acting coastal-plain streams remained at fairly high stages throughout most of March. The monthly discharge of most streams in the area was unusually high. It has been estimated that damage amounting to $350,000 resulted from the floods.

East Gulf of Mexico Drainage.—Heavy rains late in February caused most Gulf streams from western Georgia to the Mississippi River to exceed flood stages during the first few days of March. Thereafter, until about March 20, stages were generally falling. Heavy rains again fell over the area during the period March 20–23, and the effect of this storm had not passed by March 27, when heavy rainfall was again reported, with 3-day amounts of 8 inches or over in some sections. No maximum known stages were exceeded in Alabama but runoff was so well distributed throughout the month and over the State that monthly runoff for the State as a whole was one of the largest of record for any one month.

In the Tombigbee River Basin in northeast Mississippi, stages on the main stream and on some of the tributaries exceeded all recorded stages and in one instance at least, Buttahatchie River near Caledonia, Miss., the crest of the historic flood of 1892 was exceeded.

Severe flood stages were reached in the Pearl River in central and south central Mississippi. Greatest damage occurred in the Jackson area where the river rose 16.2 feet above flood stage. The flood continued into April.

Property damage was severe especially in the Tombigbee Basin. It was reported that 70 county bridges in Itawamba County alone were washed out. Damage was high both to crops already planted and as a result of the delay in planting caused by overflowed farm lands. Highway transportation was disrupted completely in some parts of the State and hundreds of people were evacuated from their homes. Several deaths are known

to have resulted from the flood. Many streams were still rising at the end of March and most of the flooding continued into April. No estimate of the damage sustained can be made at this time.

Upper Mississippi Basin.—Moderate to excessive rains occurred on March 13, 14, and 15, over southeastern Iowa and west-central Illinois, with a few heavy local rains over the upper portions of the Rock River Basin, with local amounts exceeding 3 inches. The Rock River was above flood most of the latter half of March but loss during the flood was comparatively small. There was a small amount of damage resulting from washing and from flooded cellars and lowlands and from suspension of business. Total loss is estimated at $1,500. Rains of "cloudburst" proportions were reported in the vicinity of Darlington, Wis., on March 14, that rapidly transformed the Pecatonica River into a raging torrent that produced considerable overflow from Darlington to Gratiot, Wis.

Moderate rains beginning about the middle of March caused the Illinois River to rise to stages a little above bankful beginning in the upper portion on the 16th and continuing above flood stage at downstream stations at the end of the month. The crests during March did not exceed flood stage seriously and little damage resulted. The Mississippi River at Grafton, Ill., was 0.3 foot above flood stage on the 20th and 21st.

Missouri Basin.—Ice jams and flooding were reported in southeastern Montana during the latter part of March. Ice moved out of the Tongue, Powder, and Little Missouri Rivers and resulted in ice jams in the Yellowstone River at Miles City, Crane, and Fairview. Considerable damage from flooding was reported at Miles City. The situation at Miles City was relieved late on the afternoon of March 21 when an Army Flying Fortress dropped sixteen 250-pound bombs along the 5-mile gorge below the city. The stage of the water above the jam dropped from 21.7 feet on March 21 to 6.3 feet on the 22d. Light flooding of the lowest lands along the Missouri River occurred from Sanish, N. Dak., westward to the Montana line. A resident of the bottom lands near Sanish lost cattle and hay valued at about $2,000 on March 26, when his land was overflowed by floodwaters of the Missouri.

Heavy rains about the middle of March caused light flooding along portions of the Osage River. Stages were only slightly above flood stage and little damage resulted. It is estimated that $1,500 damage resulted from the overflow, representing for the most part damage to growing wheat.

Ohio Basin.—Light flooding occurred during March at widely scattered points in the tributary streams of the Ohio River Basin and in the Ohio itself from Tell City, Ind., to the mouth of the river near the close of the month. Damage was light. The lower portion of the Ohio remained above flood stage at the end of the month.

Arkansas and Red Basins.—Flood stages were reached at a few locations along the tributaries of the Arkansas and Red Rivers. Overflow was not great in any instance and losses were comparatively light. Losses are estimated at $75,000 and occurred principally in the Neosho, Ouachita, Verdigris, and Walnut River Basins.

Lower Mississippi Basin.—Flood stages were exceeded slightly at Rossville, Tenn., on the Wolf River and at Swan Lake, Miss., on the Tallahatchie River. No material damage resulted. The Tallahatchie, Yazoo, and the Mississippi Rivers reached flood stage at several stations during the last few days of March and remained above flood at the close of the month.

West Gulf of Mexico Drainage.—Heavy rains near the end of February over northern and eastern Texas produced light flooding along the Sabine, Elm Fork, East Fork, and Trinity Rivers during the early part of March. No damage of consequence resulted from these overflows.

Heavy rains fell over the Calcasieu River, Bayou des Cannes, Bayou Nezpique, and Bayou Vermillion watersheds on March 18–19. Streams rose rapidly but flood stage was exceeded only at Basile, La., on the Bayou Nezpique. No damage resulted.

Generally heavy rains fell over the area comprising Harrison, Upshur, Gregg, Rusk, Panola, Nacogdoches, and Shelby Counties of Texas on March 28. Small streams in the area flooded causing an estimated loss of $25,000 to livestock, $30,000 damages to highways, bridges, and fences; destroyed approximately 2,000 acres of truck crops valued at $20,000; and delayed the planting of corn and other crops for several weeks. The greatest damage occurred in Panola County. At least one man was drowned in Panola County while attempting to rescue cattle from the flood waters.

The Guadalupe River was slightly above flood stage at Victoria, Tex., on March 19. No losses were reported.

FLOOD-STAGE REPORT FOR MARCH 1944

[All dates in March unless otherwise specified]

River and station	Flood stage	Above flood stages—dates		Crest [1]	
		From—	To—	Stage	Date
ST. LAWRENCE DRAINAGE					
Lake Erie	*Feet*			*Feet*	
St. Joseph: Fort Wayne, Ind.	12	17	17	12.1	17
ATLANTIC SLOPE DRAINAGE					
Chenango:					
Sherburne, N. Y.	8	17	18	9.3	17
		24	28	8.9	25
Greene, N. Y.	8	17	18	12.3	17
		25	27	9.0	26
Susquehanna:					
Oneonta, N. Y.	12	16	19	16.6	17
Unadilla, N. Y.	11	18	18	11.5	18
Bainbridge, N. Y.	12	17	18	15.7	17
Vestal, N. Y.	14	14	19	19.9	18
		24	28	16.1	27
Roanoke:					
Weldon, N. C.	31	8	10	34.8	9
		14	15	33.2	15
		31	(3)	-------	-------
Williamston, N. C.	10	(2)	(3)	11.3	20
Tar:					
Rocky Mount, N. C.	9	22	22	9.1	22
Tarboro, N. C.	18	22	26	20.5	24
Greenville, N. C.	13	21	28	15.6	25
Neuse:					
Neuse, N. C.	14	14	15	14.2	14
		20	23	16.0	21
Smithfield, N. C.	13	8	10	14.2	9
		14	17	15.8	15–16
		20	26	19.0	22
Goldsboro, N. C.	14	10	(3)	20.9	27
Kinston, N. C.	14	(2)	1	15.1	Feb. 28
		13	(3)	15.2	16
				17.8	30
Cape Fear:					
Fayetteville, N. C.	35	14	15	37.2	14
		21	24	42.5	22
Lock No. 2, Elizabethtown, N. C.	22	8	11	24.3	9
		13	18	27.3	15
		21	27	30.3	23
		31	(3)	-------	-------
Lynches: Effingham, S. C.	14	25	29	16.3	27
Waccamaw: Conway, S. C.	7	8	Apr. 5	7.3	9
				7.4	15–18
				7.5	24-26,30,3
Pee Dee:					
Cheraw, S. C.	30	14	14	31.0	14
		20	24	38.6	21
		30	Apr. 1	34.0	30
Mars Bluff Bridge, S. C.	17	Feb. 14	4	19.0	Feb. 21
				18.4	1–2
		10	Apr. 9	18.0	12
				19.3	18
				22.1	27
				20.3	Apr. 4
Saluda:					
Pelzer, S. C.	6	7	7	6.0	7
		19	24	10.1	20
		29	Apr. 2	10.0	30
Chapells, S. C.	13	20	24	24.8	20
				22.3	23
		29	Apr. 3	18.1	30

See footnotes at end of table.

FLOOD-STAGE REPORT FOR MARCH 1944—Continued

River and station	Flood stage	Above flood stages—dates: From—	Above flood stages—dates: To—	Crest [1]: Stage	Crest [1]: Date
ST. LAWRENCE DRAINAGE—continued					
Lake Erie—Continued	*Feet*			*Feet*	
Broad: Blairs, S. C.	14	8	8	15.0	8
		19	24	25.5	20
		30	[3]	19.0	31
Congare: Columbia, S. C.	19	20	22	24.5	21
Catawba:					
Catawba, N. C.	8	29	31	9.7	30
Catawba, S. C.	11	20	21	13.2	20
Wateree: Camden, S. C.	23	21	25	29.1	21
Broad: Carlton, Ga.	15	29	30	16.0	30
Savannah:					
Augusta, Ga.	32	21	22	33.9	21
Butler Creek, Ga.	21	21	26	25.4	22
Ogeechee:					
Midville, Ga.	6	23	31	9.4	25
Dover, Ga.	7	[2]	3	7.5	Feb. 29
		8	21	7.7	17-18
		21	[3]	12.4	28
Ocmulgee:					
Macon, Ga.	18	19	21	22.4	20
		22	25	23.0	24
		29	31	22.6	30
Hawkinsville, Ga.	25	23	29	29.7	26
Abbeville, Ga.	11	23	Apr. 11	17.7	28
Oconee:					
Milledgeville, Ga.	20	20	26	33.1	21
		29	Apr. 2	23.5	30
Dublin, Ga.	21	23	30	28.9	26
Mount Vernon, Ga.	16	24	Apr. 9	21.9	28
Altamaha:					
Charlotte, Ga.	12	------	------	24.8	31
Piney Bluff, Ga.	17	16	17	17.0	16-17
		24	[3]	------	------
Doctortown, Ga.	10	31	Apr. 6	10.5	Apr. 2-3
Everett City, Ga.	10	29	[3]	14.9	Apr. 4
EAST GULF OF MEXICO DRAINAGE					
Chattahoochee:					
Norcross, Ga.	16	21	21	16.3	21
		30	30	17.2	30
Columbus, Ga.	34	23	23	35.0	23
Eufaula, Ala.	40	23	26	49.2	25
		30	Apr. 2	44.8	31
Columbia, Ala.	42	24	27	45.6	25
		31	Apr. 2	43.1	Apr. 1
Flint:					
Montezuma, Ga.	20	23	24	21.4	23
		25	27	22.1	26
Albany, Ga.	20	23	Apr. 5	31.3	26
Bainbridge, Ga.	25	26	Apr. 8	32.9	30
Apalachicola:					
Chattahoochee, Fla.	20	25	Apr. 7	24.8	28
				25.6	Apr. 3
Blountstown, Fla.	15	8	18	17.8	12-13
		21	[3]	23.1	29
Choctawhatchee:					
Newton, Ala.	19	24	25	21.3	25
Geneva, Ala.	23	26	27	24.6	26
Caryville, Fla.	12	24	Apr. 5	13.6	28
				13.1	Apr. 3
Conecuh:					
River Falls, Ala.	35	23	27	40.5	24
		31	Apr. 1	36.0	31
Brewton, Ala.	17	24	Apr. 5	19.8	28
				18.9	Apr. 3
Black Warrior:					
Lock No. 10, Tuscaloosa, Ala.	47	[2]	1	52.0	Feb. 29
		28	[3]	62.0	30
Lock No. 7, Eutaw, Ala.	35	[2]	6	44.1	3
		22	[3]	------	------
Tombigbee:					
Aberdeen, Miss.	34	[2]	2	35.2	1
		28	[3]	43.0	30
Columbus, Miss.	29	30	[3]	------	------
Gainesville, Ala.	36	[2]	6	37.3	2
		29	[3]	------	------
Lock No. 4, Demopolis, Ala.	39	[2]	13	51.3	4
		22	[3]	------	------
Lock No. 3, Ala.	33	[2]	15	52.6	5
		21	[3]	------	------
Lock No. 2, Ala.	46	[2]	13	53.9	7
		23	[3]	------	------
Lock No. 1, Ala.	31	[2]	17	36.5	9
		23	[3]	------	------
Chickashawhay:					
Enterprise, Miss.	20	30	[3]	------	------
Shubuta, Miss.	30	Feb. 29	Feb. 29	30.0	Feb. 29
		24	26	32.0	25
		28	31	31.9	29
Pascagoula: Merrill, Miss.	22	24	[3]	------	------
Bogue Chitto: Franklinton, La.	11	29	Apr. 1	13.7	30
Pearl:					
Edinburg, Miss.	20	[2]	4	23.1	Feb. 29
		28	[3]	------	------
Jackson, Miss.	18	[2]	15	28.3	5-7
		20	[3]	------	------
Monticello, Miss.	15	10	13	16.0	12
		22	24	18.2	24
		24	[3]	------	------
Columbia, Miss.	17	24	[3]	18.6	25
Pearl River, La.	12	[2]	7	13.7	3
		9	[3]	------	------

See footnotes at end of table.

FLOOD-STAGE REPORT FOR MARCH 1944—Continued

River and station	Flood stage	Above flood stages—dates: From—	Above flood stages—dates: To—	Crest [1]: Stage	Crest [1]: Date
MISSISSIPPI SYSTEM					
Upper Mississippi Basin	*Feet*			*Feet*	
Rock: Moline, Ill.	10	[2]	8	10.9	1-2
		14	28	13.5	19
Fox: Wayland, Mo.	15	15	16	16.0	16
Salt: New London, Mo.	19	16	18	22.5	17
Illinois:					
Morris, Ill.	13	16	17	15.6	16
Peru, Ill.	17	15	20	20.2	16
		30	30	17.0	30
Havana, Ill.	14	19	[3]	15.6	20-21
Beardstown, Ill.	14	20	[3]	15.0	21-24
Mississippi:					
Keokuk, Iowa	12	16	19	12.7	18
Quincy, Ill.	14	16	20	16.3	17
Hannibal, Mo.	13	15	22	16.9	17
Louisiana, Mo.	12	[2]	2	12.3	Feb. 28
		4	7	12.2	5-6
		15	23	16.2	18
		27	30	12.2	28-29
Grafton, Ill.	18	20	21	18.3	20-21
Missouri Basin					
Grand: Chillicothe, Mo.	18	15	17	26.2	16
Osage:					
Quenemo, Kans.	30	17	17	30.5	17
La Cygne, Kans.	25	18	19	25.6	18
Trading Post, Kans.	24	19	20	25.1	19
Osceola, Mo.	20	20	25	21.3	23
Ohio Basin					
Monongahela: Lock No. 2, Braddock, Pa.	20.5	25	25	20.5	25
Hocking: Athens, Ohio	17	8	8	17.2	8
Scioto:					
La Rue, Ohio	11	7	8	12.2	7
Circleville, Ohio	14	7	8	15.7	8
Piketon, Ohio	16	7	9	18.4	8
North Fork: Jackson, Ky.	29	1	1	28.1	1
Barren: Bowling Green, Ky.	28	1	2	30.9	2
Green:					
Lock No. 4, Woodbury, Ky.	33	1	4	36.9	3
Lock No. 2, Rumsey, Ky.	34	25	27	34.5	26
West Fork:					
Anderson, Ind.	10	5	5	10.3	5
		7	8	11.7	8
		28	28	10.0	28
Elliston, Ind.	18	7	10	19.5	9
Edwardsport, Ind.	12	6	13	17.4	10
		28	31	14.0	30
Wabash:					
Wabash, Ind.	12	7	7	12.5	7
La Fayette, Ind.	11	7	9	13.2	8
Cumberland:					
Williamsburg, Ky.	19	[2]	2	22.0	1
Celina, Tenn.	28	[2]	5	38.3	3
		21	24	33.8	23
Lock No. 5, Lebanon, Ky.	45.5	1	3	46.3	2
Nashville, Tenn.	40	8	8	40.0	8
Lock No. 2, Neptune, Tenn.	40	[2]	4	41.3	1
Clarksville, Tenn.	46	[2]	5	48.3	1
Lock F, Eddyville, Ky.	50	[2]	13	54.7	5
French Broad: Asheville, N. C.	6	29	30	6.2	29
Duck: Columbia, Tenn.	32	29	[3]	34.7	30
Tennessee:					
Chattanooga, Tenn.	30	30	30	31.7	30
Florence, Ala.	18	8	8	18.1	8
		28	Apr. 4	25.4	30
Pickwick Landing, Tenn.	43	29	Apr. 5	49.6	Apr. 2
Savannah, Tenn.	39	30	Apr. 5	44.0	Apr. 3
Johnsonville, Tenn.	31	31	[3]	36.5	Apr. 4
Ohio:					
Tell City, Ind.	38	25	28	38.6	26
Dam No. 47, Newburgh, Ind.	38	24	Apr. 3	41.5	27
Evansville, Ind.	37	25	Apr. 2	39.0	28
Dam No. 48, near Henderson, Ky.	38	25	Apr. 3	40.0	29
Mount Vernon, Ind.	35	26	Apr. 4	37.2	30
Dam No. 49, Uniontown, Ky.	37	28	Apr. 3	37.6	30-31
Shawneetown, Ill.	33	11	15	34.4	13
		25	Apr. 6	37.5	31
Dam No. 50, Fords Ferry, Ky.	34	9	16	36.7	13-14
		24	Apr. 8	39.9	31
Paducah, Ky.	39	31	[3]	41.2	Apr. 4
Dam No. 52, Brookport, Ill.	37	5	15	39.0	12
		24	[3]	43.1	Apr. 5
Dam No. 53, near Mound City, Ill.	42	5	15	43.8	11-12
		23	[3]	48.0	Apr. 5
Cairo, Ill.	40	5	15	41.6	9-10
		21	[3]	45.6	Apr. 5
White Basin					
White:					
Georgetown, Ark.	21	8	9	21.0	8-9
		27	30	21.1	28-29
Clarendon, Ark.	26	11	16	26.2	12-14
		25	[3]	------	------
St. Charles, Ark.	25	16	21	25.1	19
		26	[3]	------	------

FLOOD STAGE REPORT FOR MARCH 1944—Continued

River and station	Flood stage	Above flood stages—dates		Crest [1]	
		From—	To—	Stage	Date
MISSISSIPPI SYSTEM—continued					
Arkansas Basin					
	Feet			*Feet*	
Verdigris: Claremore, Okla	32	16	23	34.3	23
Cottonwood: Emporia, Kans	20	17	18	21.5	17
		24	25	22.4	24
Neosho:					
Neosho Rapids, Kans	22	17	17	22.5	17
Burlington, Kans	23	17	19	27.4	18
		25	26	24.8	25
Iola, Kans	15	19	20	17.6	19
Chanute, Kans	20	18	20	23.1	20
Parsons, Kans	24	19	22	25.5	21
Oswego, Kans	17	19	23	22.0	20
Poteau: Poteau, Okla	21	19	23	27.0	21
Petit Jean: Danville, Ark	20	[2]	3	23.3	1
		17	24	23.2	21
Red Basin					
Little Missouri: Boughton, Ark	20	19	21	21.8	20
Oachita:					
Arkadelphia, Ark	17	[2]	2	19.4	1
		18	22	23.5	19
		29	29	17.0	29
Camden, Ark	26	1	10	30.2	5
		20	29	34.2	24-25
		29	[3]		
Little: Whitecliffs, Ark	25	2	5	25.6	3
		19	23	26.0	20-21
Sulphur:					
Hagansport, Tex	38	[2]	5	39.9	Feb. 29
		19	22	39.6	19
Naples, Tex	22	2	12	26.3	4
		20	Apr. 1	27.8	23

FLOOD STAGE REPORT FOR MARCH 1944—Continued

River and station	Flood stage	Above flood stages—dates		Crest [1]	
		From—	To—	Stage	Date
MISSISSIPPI SYSTEM—continued					
Lower Mississippi Basin					
	Feet			*Feet*	
Wolf: Rossville, Tenn	10	29	31	10.9	29
Big Lake Outlet: Manila, Ark	10	4	14	10.7	9-10
Tallahatchie: Swan Lake, Miss	26	2	8	26.6	4-5
		30	[3]		
Yazoo: Yazoo City, Miss	29	28	[3]	30.8	29
Mississippi: New Madrid, Mo	34	31	[3]	35.7	Apr. 5
WEST GULF OF MEXICO DRAINAGE					
Nezpique Bayou: Basile, La	18	21	25	23.4	
Sabine: Logansport, La	25	[2]	12	28.8	1-2
		30	[3]		
East Fork: Rockwall, Tex	10	[2]	3	14.4	1
		4	7	13.1	6
		19	21	14.8	19
Trinity:					
Dallas, Tex	28	[2]	3	32.2	1
Rosser, Tex	26	Feb. 29	6	28.1	4
Trinidad, Tex	28	2	9	29.9	7-8
Long Lake, Tex	40	2	6	41.0	4
Liberty, Tex	24	9	15	24.7	12-13
Guadalupe: Victoria, Tex	21	19	19	23.6	19

[1] Provisional.
[2] Continued from February.
[3] Continued at end of month.

CLIMATOLOGICAL DATA

CONDENSED CLIMATOLOGICAL SUMMARY OF TEMPERATURE AND PRECIPITATION BY SECTIONS

[For description of tables and charts, see REVIEW January 1943, p. 15]

In the following table are given for the various sections of the climatological service of the Weather Bureau the monthly average temperature and total rainfall; the stations reporting the highest and lowest temperatures, with dates of occurrence; the stations reporting the greatest and least total precipitation; and other data as indicated by the several headings.

The mean temperature for each section, the highest and lowest temperatures, the average precipitation, and the greatest and least monthly amounts are found by using all trustworthy records available.

The mean departures from normal temperatures and precipitation are based only on records from stations that have 10 or more years of observations. Of course, the number of such records is smaller than the total number of stations.

Section	Temperature								Precipitation					
	Section average	Departure from the normal	Monthly extremes						Section average	Departure from the normal	Greatest monthly		Least monthly	
			Station	Highest	Date	Station	Lowest	Date			Station	Amount	Station	Amount
	°F.	°F.		°F.			°F.		In.	In.		In.		In.
Alabama	57.7	+1.7	Geneva	86	....	4 stations	22	9	10.77	+5.03	Troy	16.69	Wadley	6.80
Arizona	48.0	−3.6	Yuma	88	31	Fort Valley	−6	15	1.18	+.14	Pinal Ranch	3.54	Seligman	.10
Arkansas	51.3	−1.1	Corning	87	15	2 stations	14	8	6.13	+1.48	Arkansas City	11.80	Cotter	3.24
California	50.6	−.2	Greenland Ranch	92	31	Bridgeport (near)	−21	6	1.85	−1.99	West Branch	7.63	Yucca Grove	.00
Colorado	31.3	−3.2	Las Animas	77	13	Taylor Park	−33	8	1.78	+.45	Wolf Creek Pass	8.85	Utleyville	.08
Florida	67.9	+2.7	Okeechobee	95	26	Hilliard	27	9	5.58	+2.34	Crestview	11.49	Homestead	.46
Georgia	56.7	+.6	Camp Stewart	88	26	Blairsville	17	10	10.59	+5.57	Talbotton	16.37	Atlanta AP	5.93
Idaho	32.1	−3.6	Lewiston	73	30	Landmark	−35	7	1.03	−.72	Pierce	4.81	Richfield	T
Illinois	37.2	−3.5	2 stations	82	[1] 14	Freeport	−6	10	4.27	+1.14	LaHarpe	7.21	Vandalia	2.06
Indiana	38.1	−2.5	do	82	15	Goshen	1	10	4.31	+.61	La Porte	8.22	Farmersburg	2.51
Iowa	30.3	−4.2	Muscatine	67	24	Delaware	−7	9	2.58	+.85	Burlington	5.20	Inwood	.76
Kansas	39.2	−4.1	2 stations	77	[1] 13	Tribune	2	19	2.96	+1.52	Augusta	5.92	Richfield	.41
Kentucky	45.2	−1.0	do	84	[1] 15	2 stations	8	9	5.50	+.77	Greensburg	8.21	Greenville	3.77
Louisiana	60.8	+.3	do	87	[1] 12	Camp Beauregard	26	8	5.75	+1.00	Tallulah	13.36	Patterson	1.97
Maryland-Delaware	40.3	−2.3	do	82	[1] 15	Oakland, Md.	0	10	5.63	+1.99	Snow Hill, Md	7.57	Picardy, Md	2.02
Michigan	26.7	−2.9	3 stations	64	[1] 24	Watersmeet	−28	19	2.76	+.67	Mass	5.90	Mio	1.05
Minnesota	22.4	−4.0	2 stations	55	23	Big Falls	−32	9	1.19	−.01	Pigeon River Bridge	2.99	Artichoke	.41
Mississippi	57.6	+.7	Magnolia	88	7	Rochdale	23	8	9.44	+3.62	Grenada	15.29	Philadelphia	5.81
Missouri	41.4	−2.4	Crystal City	83	14	Unionville	6	10	3.78	+.61	Mexico	8.28	Tecumseh	1.83
Montana	26.5	−4.6	3 stations	65	[1] 23	West Yellowstone	−29	28	.93	−.04	Kings Hill	2.75	Wise River	.13
Nebraska	30.5	−5.9	Benkelman	72	10	Hartington	−11	6	1.58	+.47	Falls City	3.83	Burwell	.53
Nevada	38.0	−2.6	Mesquite	87	9	Marlette Lake	−6	6	.64	−.34	Marlette Lake	3.76	2 stations	.00
New England	29.4	−2.7	East Wareham, Mass	66	25	Lake Frontiere, Maine	−28	11	4.06	+.38	2 stations	8.50	Newport, Vt	.97
New Jersey	37.1	−2.1	Belleplain	74	16	Chatsworth	2	6	5.68	+1.91	Ridgefield	7.47	Layton	2.75
New Mexico	41.3	−2.3	Obar	91	5	Eagle Nest	−18	18	.36	−.40	Chama	2.93	17 stations	.00
New York	28.8	−3.2	3 stations	69	25	Wanakena	−28	5	3.41	+.32	Cutchogue	7.63	Peru	.71
North Carolina	49.0	−.9	2 stations	88	[1] 26	Mount Mitchell	0	9	7.20	+2.94	Highlands	12.14	Goldsboro	4.52
North Dakota	16.7	−6.9	Medora	53	31	Parshall	−25	18	.81	+.02	Cavalier	2.41	New Salem	.17
Ohio	36.7	−2.0	Ironton	83	15	Hillsboro	3	9	4.87	+1.45	Ironton	7.13	Vickery	2.17
Oklahoma	48.6	−2.1	Ada	87	31	Kenton	8	29	2.91	+.77	Watts	7.62	Boise City	.36
Oregon	39.2	−1.8	2 stations	79	[1] 29	2 stations	−18	14	1.63	−1.09	Valsetz	9.19	Lower Trout Creek	.05
Pennsylvania	34.4	−3.1	Donora	79	15	Kane	−6	10	4.69	+1.17	Johnstown	8.44	Union City	1.87
South Carolina	54.0	−.7	Orangeburg	89	26	Caesars Head	17	9	8.85	+4.83	Caesars Head	12.53	Florence Airport	4.89
South Dakota	23.8	−7.3	Pine Ridge	67	11	2 stations	−18	29	.84	−.27	Spearfish	2.69	Raymond	.27
Tennessee	49.5	+.1	Gatlinburg	85	26	Rugby	11	9	6.95	+1.57	Copperhill	12.20	Martin	3.60
Texas	57.1	−1.4	Mission	102	26	Stratford	7	29	2.60	+.61	Goose Creek	9.22	10 stations	.00
Utah	33.9	−4.4	2 stations	76	[1] 12	Woodruff	−14	28	2.16	+.72	Silver Lake (Brighton)	9.57	Thompsons	.12
Virginia	43.8	−1.9	do	86	[1] 15	Mountain Lake	−1	10	5.59	+1.89	Pennington Gap	8.24	Glen Lyn	2.80
Washington	39.8	−1.8	Wahluke (near)	79	[1] 30	Bumping Lake	−4	[1] 13	2.09	−1.36	Higley Peak	16.64	Mansfield	.01
West Virginia	40.2	−2.1	2 stations	87	[1] 15	Cranberry Glades	−14	10	5.21	+1.29	Pickens	7.70	Arborvale	3.50
Wisconsin	26.2	−2.9	do	64	24	Rest Lake	−27	19	2.02	+.27	2 stations	3.62	Amery	1.01
Wyoming	26.0	−3.8	Fort Laramie	69	9	Moran	−31	28	1.55	+.40	Elk Mountain	4.27	Powell	.03
Alaska (February)	17.2	+9.1	Tree Point	44	2	2 stations	−47	[1] 14	2.16	+.25	Latouche	18.24	Rapids	.16
Hawaii	69.9	+1.0	3 stations	89	[1] 6	Haleakala Ranger Station	35	26	9.50	+.80	Kukui	27.00	Halepohaku	.95
Puerto Rico	74.0	+.5	4 stations	92	[1] 5				1.39	−2.00	Calero Camp	4.63	7 stations	.00

[1] Other dates also.

CLIMATOLOGICAL DATA FOR WEATHER BUREAU STATIONS

District and station	Elevation of instruments: Barometer above sea level	Elevation of instruments: Thermometer above ground	Elevation of instruments: Anemometer above ground	Pressure: Station	Pressure: Sea level	Pressure: Departure from normal	Temperature of the air: Mean max. + mean min. ÷ 2	Temperature of the air: Departure from normal	Temperature of the air: Maximum	Temperature of the air: Date	Temperature of the air: Mean maximum	Temperature of the air: Minimum	Temperature of the air: Date	Temperature of the air: Mean minimum	Temperature of the air: Greatest daily range	Mean temperature of the dew-point	Mean relative humidity	Precipitation: Total	Precipitation: Departure from normal	Precipitation: Days with 0.01 inch or more	Wind: Average hourly velocity	Wind: Prevailing direction	Wind: Maximum velocity: Miles per hour	Wind: Maximum velocity: Direction	Wind: Maximum velocity: Date	Clear days	Partly cloudy days	Cloudy days	Average cloudiness, tenths	Total snowfall	Snow, sleet, and ice on ground at end of month	Number of days with thunderstorms
	Ft.	Ft.	Ft.	Mbs.	Mbs.	Mbs.	°F.	°F.	°F.		°F.	°F.		°F.	°F.	°F.	%	In.	In.		Mi.								0-10	In.	In.	
New England							**30.8**	**−1.4**									**69**	**4.63**	**+1.2**										**6.0**			
Eastport	75	67	85	1,013.2	1,016.6	+3.1	27.4	−1.5	54	25	34	1	4	21	27	16	64	4.66	+.8	13	12.5	nw.	34	s.	7	14	3	14	5.1	5.1	T	0
Greenville, Maine	1,070	6	41	976.3	1,017.6	......	20.5	−4.0	56	25	32	−17	11	9	50	14	...	3.14	+.2	11	....	nw.	...	......	...	10	11	10	....	19.1	25.0	0
Portland, Maine [1]	103	5	43	1,013.5	1,018.0	+3.4	29.1	−2.7	56	25	38	3	3	20	32	22	75	5.10	+1.2	10	10.4	nw.	35	e.	30	18	3	10	5.0	13.9	.0	0
Concord [1]	289	4	45	1,007.1	1,018.6	+2.7	28.2	−.9	62	25	38	0	11	19	39	16	62	3.92	+.9	10	8.2	nw.	39	nw.	28	9	11	11	5.8	13.4	.5	1
Burlington [1]	403	6	51	1,002.7	1,019.0	+3.1	25.4	−3.7	56	25	34	−13	5	16	42	18	75	1.37	−.7	15	10.5	s.	34	se.	6	4	14	13	6.5	3.7	T	0
Boston [1]	124	33	62	1,013.2	1,018.3	+3.4	34.1	−1.5	64	25	42	10	19	27	28	21	61	3.92	+.4	11	13.7	nw.	37	ne.	20	5	13	13	6.5	12.7	.0	0
Nantucket	12	11	59	1,016.9	1,018.0	+2.8	35.8	+.3	61	26	42	18	2	30	24	28	78	6.46	+2.7	15	13.2	n.	35	ne.	20	11	8	12	5.8	8.1	.0	1
Block Island	26	11	46	1,016.9	1,018.3	+3.1	35.0	−.4	55	25	41	15	19	29	21	26	78	5.19	+1.4	13	18.0	n.	45	nw.	18	15	3	13	5.5	2.8	.0	1
Providence [1]	159	46	60	1,012.5	1,019.0	+3.8	35.6	−.1	64	25	43	12	19	28	28	22	64	5.00	+1.5	11	10.2	n.	33	sw.	8	6	13	12	6.3	8.9	.0	0
Hartford [1]	159	5	44	1,012.9	1,019.3	+3.7	33.8	−1.2	62	25	43	9	6	25	38	22	68	5.02	+1.1	15	10.0	n.	33	nw.	28	6	10	15	6.7	12.2	.0	0
New Haven [1]	107	5	39	1,014.9	1,019.3	+3.7	34.4	−.1	58	25	42	12	6	27	30	22	66	7.16	+3.4	16	8.9	ne.	26	ne.	28	7	9	15	6.6	7.7	.0	1
Middle Atlantic States							**39.4**	**−1.0**									**70**	**5.18**	**+1.8**										**6.3**			
Albany [1]	97	36	40	1,015.2	1,019.3	+3.0	29.0	−.8	62	25	37	0	5	21	37	18	69	2.45	−.2	14	10.7	w.	33	w.	28	4	13	14	6.6	11.7	.0	0
Binghamton [1]	871	60	79	986.1	1,019.6	+3.0	30.6	−2.0	65	25	40	−3	6	21	46	20	71	3.20	+.6	15	6.6	w.	19	nw.	1	4	9	18	7.3	11.6	.0	0
New York	314	415	454	1,006.8	1,019.0	+3.1	37.0	−.7	60	25	44	15	5	30	27	22	59	6.62	+3.0	12	17.2	n.	54	nw.	1	5	12	14	6.6	4.2	.0	1
Harrisburg [1]	374	30	49	1,005.1	1,019.3	+2.4	37.0	−1.9	69	25	46	12	6	29	36	26	70	5.47	+2.4	15	9.0	se.	35	nw.	28	4	13	14	6.8	13.2	.0	1
Philadelphia [1]	114	6	56	1,014.9	1,019.6	+3.0	38.5	−.6	66	25	47	17	6	30	33	28	70	5.46	+2.1	15	11.5	n.	30	nw.	13	5	11	15	6.6	7.8	.0	1
Reading	323	47	306	1,006.8	1,019.3	......	37.9	−2.7	67	25	46	15	6	30	32	...	...	5.47	+2.0	14	12.7	nw.	40	e.	29	3	14	14	6.9	13.9	.0	2
Scranton	805	72	104	988.8	1,019.3	+2.7	33.4	−2.3	67	25	42	10	2	25	36	...	...	2.67	−.5	14	7.5	n.	26	nw.	1	5	15	11	6.8	5.7	.2	0
Atlantic City	52	37	172	1,016.6	1,019.0	+2.4	39.6	+1.0	62	26	46	20	5	33	22	32	80	5.32	+1.7	15	18.0	w.	51	se.	7	6	13	12	6.2	4.9	.0	2
Trenton	190	89	107	1,011.9	1,019.3	......	37.9	−1.2	67	25	46	19	5	30	31	26	68	5.66	+2.3	13	10.3	n.	32	nw.	1	5	12	14	6.6	4.9	.0	1
Baltimore [1]	123	100	215	1,014.2	1,019.3	+2.4	41.8	−.5	68	16	50	20	5	34	23	28	66	6.04	+2.3	13	11.0	n.	33	nw.	13	8	10	13	6.0	6.9	.0	1
Washington [1]	112	56	100	980.7	1,019.3	+2.0	43.0	+.4	81	16	51	21	10	34	31	28	64	5.44	+1.7	14	8.5	nw.	29	nw.	17	11	7	13	5.8	.5	.0	1
Cape Henry	18	8	54	1,017.3	1,018.6	......	46.4	−.2	84	27	54	27	2	39	37	38	76	5.56	+1.7	15	14.4	n.	38	nw.	1	13	5	13	5.6	T	.0	4
Lynchburg	686	144	184	992.9	1,018.6	+1.0	45.2	−2.1	81	26	56	16	10	35	45	32	68	5.77	+2.2	12	8.2	nw.	26	nw.	1	12	5	14	5.5	1.6	.0	2
Norfolk [1]	91	80	125	1,015.2	1,019.3	+2.4	47.9	−.3	83	27	57	28	2	39	34	37	76	6.97	+3.2	14	11.6	sw.	29	nw.	1	10	6	15	6.0	T	.0	4
Richmond	144	11	52	1,012.9	1,018.6	+1.3	45.5	−1.7	80	16	55	19	10	36	38	33	70	5.67	+2.0	14	9.6	sw.	30	nw.	17	11	8	12	5.5	T	.0	3
South Atlantic States							**54.7**	**+1.1**									**75**	**7.66**	**+3.9**										**5.5**			
Asheville	2,253	77	92	937.7	1,018.3	+.3	46.4	+1.5	79	26	58	18	10	35	44	32	68	5.30	+1.3	10	10.0	nw.	33	se.	28	11	6	14	5.7	.1	.0	2
Charlotte [1]	779	63	86	989.5	1,018.3	+.7	51.0	+.6	82	26	61	25	10	41	32	38	72	8.34	+4.2	13	8.4	ne.	27	sw.	4	11	5	15	5.5	.0	.0	2
Greensboro [1]	886	6	56	986.1	1,019.0	......	46.0	......	80	26	58	19	10	34	38	34	70	6.94	.....	13	9.1	ne.	27	ne.	19	12	6	13	5.4	.0	.0	1
Hatteras	11	5	50	1,018.0	1,018.6	+1.3	51.8	−.2	72	27	59	30	3	45	26	45	84	4.89	+.6	12	15.1	ne.	38	nw.	1	13	2	16	5.9	.0	.0	4
Raleigh [1]	376	27	69	1,004.4	1,019.0	+1.4	49.4	+.5	83	27	60	22	10	38	36	37	72	7.18	+3.3	12	10.4	ne.	32	w.	8	11	8	12	5.5	.0	.0	2
Wilmington	72	73	107	1,015.9	1,019.0	+1.4	55.0	+1.7	83	27	65	30	2	45	29	46	80	6.83	+3.7	13	10.3	ne.	33	sw.	7	15	3	13	5.3	.0	.0	4
Charleston [1]	48	11	92	1,016.3	1,018.3	+.3	58.7	+1.3	80	27	66	34	2	51	21	49	83	10.51	+7.5	14	10.9	sw.	31	e.	22	10	6	15	5.9	.0	.0	8
Columbia, S. C. [1]	349	70	91	1,005.4	1,018.3	+.3	54.7	−.5	84	26	65	31	9	45	31	43	74	6.90	+3.5	12	8.9	ne.	26	sw.	4	12	7	12	5.4	.0	.0	2
Greenville, S. C. [1]	1,040	18	36	980.0	1,018.0	......	50.5	+.6	79	26	61	24	9	40	32	38	70	7.43	+2.3	16	11.3	sw.	40	ne.	19	13	3	15	5.5	.0	.0	4
Augusta [1]	182	62	77	1,011.2	1,018.0	.0	56.4	+.4	85	26	67	32	9	46	33	43	68	9.30	+5.2	15	6.0	nw.	23	nw.	27	13	4	14	5.4	.0	.0	7
Savannah [1]	65	73	152	1,016.3	1,018.6	+.6	62.0	+3.0	84	27	71	36	9	53	25	51	82	9.96	+6.9	15	11.2	sw.	38	n.	29	9	10	12	5.4	.0	.0	9
Jacksonville [1]	43	86	110	1,016.6	1,018.6	+.6	65.4	+2.8	86	19	74	37	9	57	28	55	80	7.60	+4.7	14	7.9	s.	28	n.	29	11	11	9	5.4	.0	.0	8
Florida Peninsula							**72.6**	**+2.7**									**79**	**2.38**	**+0.2**										**4.8**			
Key West [1]	21	10	64	1,016.3	1,017.3	−.3	76.1	+3.5	86	30	81	61	9	71	17	66	77	2.01	+.6	6	10.8	e.	31	nw.	12	20	7	4	3.4	.0	.0	2
Miami [1]	25	242	249	1,016.9	1,018.0	−.6	72.6	+2.3	86	24	77	50	8	68	22	64	79	1.34	−1.3	8	14.6	se.	32	e.	11	15	9	7	4.8	.0	.0	1
Tampa [1]	35	6	43	1,016.9	1,018.3	.0	69.1	+2.3	87	26	77	44	9	61	31	61	81	3.78	+1.4	8	11.4	s.	30	s.	7	7	10	14	6.1	.0	.0	4
East Gulf States							**59.2**	**+1.4**									**76**	**8.87**	**+3.7**										**5.8**			
Atlanta [1]	1,173	33	72	975.3	1,018.0	.0	52.9	+.9	81	26	63	27	9	42	32	40	70	5.93	+.5	13	11.1	nw.	31	w.	4	12	7	12	5.5	T	.0	5
Macon [1]	370	79	87	1,004.1	1,018.0	.0	57.1	+.4	80	18	68	31	9	46	31	46	75	12.52	+7.6	15	7.3	nw.	27	s.	19	12	7	12	5.4	.0	.0	9
Thomasville	273	49	58	1,007.8	1,018.0	.0	63.2	+3.0	83	26	75	35	9	52	35	...	...	9.64	+5.6	13	....	......	...	......	...	8	7	16	....	.0	.0	7
Apalachicola	35	11	51	1,016.3	1,017.6	......	64.2	+2.6	78	12	71	40	9	57	22	56	83	4.85	+.6	9	9.2	e.	26	e.	22	8	10	13	6.2	.0	.0	5
Pensacola	56	54	79	1,015.6	1,017.6	−.4	62.0	+1.7	76	26	70	39	9	54	25	54	81	10.43	+5.7	11	8.3	se.	27	se.	11	11	5	15	5.7	.0	.0	6
Anniston	741	9	...	......	......	......	55.8	+1.7	83	26	68	25	9	44	39	...	...	9.62	+4.0	11	....	nw.	...	......	...	11	12	8	....	.0	.0	5
Birmingham [1]	700	5	62	992.2	1,017.6	−.4	55.0	+1.2	82	26	66	27	9	44	37	44	72	7.17	+1.5	10	9.4	s.	37	se.	22	11	7	13	5.7	.0	.0	7
Mobile [1]	57	86	161	1,015.2	1,017.6	−.4	61.6	+1.9	79	14	70	39	1	53	28	53	84	11.15	+5.2	13	6.9	s.	28	nw.	22	11	5	15	6.0	.0	.0	8
Montgomery [1]	218	92	105	1,009.5	1,017.3	−.7	59.0	+1.2	80	14	68	33	9	50	28	47	72	11.04	+5.0	13	7.0	s.	25	e.	22	11	5	15	5.5	.0	.0	6
Meridian [1]	375	67	92	1,003.4	1,016.9	−.7	57.4	+.3	83	14	68	30	9	47	34	47	74	7.77	+2.5	11	6.9	s.	24	nw.	28	11	7	13	5.8	.0	.0	8
Vicksburg [1]	247	82	102	1,007.1	1,016.3	−1.0	58.6	+.1	84	14	68	36	1	49	31	46	75	10.39	+4.8	14	9.2	s.	32	nw.	28	10	4	17	6.2	.0	.0	8
New Orleans [1]	53	50	84	1,014.6	1,016.6	−.7	63.7	+1.9	82	27	72	44	9	56	29	54	76	5.93	+1.2	11	7.2	se.	21	se.	11	12	1	18	5.9	.0	.0	7
West Gulf States							**59.1**	**−0.9**									**75**	**4.70**	**+1.8**										**6.3**			
Shreveport [1]	249	5	64	1,006.8	1,015.6	−1.0	58.0	−.7	80	25	68	36	8	48	35	48	74	7.37	+3.3	11	10.4	se.	42	sw.	6	10	5	16	6.0	.0	.0	7
Fort Smith	463	57	82	998.6	1,015.2	−1.1	51.0	−1.6	81	14	61	26	8	41	39	40	67	5.18	+2.2	10	10.4	e.	31	nw.	7	7	10	14	6.0	.2	.0	5
Little Rock [1]	357	5	58	1,003.1	1,016.3	−.6	51.6	−1.4	82	14	62	28	8	41	37	42	74	7.86	+3.2	13	10.0	nw.	40	nw.	7	8	8	15	6.2	.0	.0	6
Austin [1]	605	10	41	993.6	1,014.6	......	58.6	−2.1	81	26	69	32	20	48	36	50	75	1.83	−.5	10	10.2	s.	32	nw.	28	8	5	18	6.3	.0	.0	5
Brownsville [1]	57	5	54	1,010.8	1,012.5	......	69.6	+1.4	90	22	78	45	29	61	30	62	81	1.26	−.3	9	13.0	se.	35	nw.	29	7	9	15	6.4	.0	.0	4
Corpus Christi [1]	20	4	33	1,013.2	1,013.9	−1.3	64.8	+1.8	82	26	72	41	31	57	31	58	82	1.69	.....	10	13.2	se.	34	n.	28	9	4	18	6.4	.0	.0	3
Dallas [1]	512	5	45	996.3	1,015.2	......	55.2	−2.2	83	26	66	29	29	44	35	44	73	4.17	+1.3	9	12.8	s.	40	s.	3	9	5	17	6.4	.0	.0	4
Fort Worth [1]	679	5	56	990.9	1,014.9	−.3	54.9	−1.8	83	26	66	28	29	44	35	42	68	1.30	−1.0	8	13.2	se.	42	se.	3	8	6	17	6.3	.0	.0	1
Galveston [1]	54	106	114	1,013.2	1,015.2	−1.1	62.4	.0	76	28	67	42	20	57	24	56	82	8.79	+6.1	10	11.9	se.	38	e.	10	7	8	16	6.3	.0	.0	6
Houston [1]	138	157	190	1,010.2	1,015.2	......	62.1	−1.2	82	28	70	38	20	54	35	54	80	5.28	+1.8	8	11.8	se.	34	e.	10	9	3	19	6.6	.0	.0	4
Palestine	510	64	72	997.6	1,015.9	.0	57.9	−1.2	80	26	67	33	29	48	33	46	70	3.95	+.5	11	8.8	s.	26	nw.	28	10	3	18	6.2	.0	.0	6
Port Arthur	34	59	134	1,014.2	......	......	62.2	+.3	81	27	70	40	30	55	26	54	78	5.75	+2.5	7	13.9	s.	44	e.	10	10	3	18	6.0	.0	.0	4
San Antonio [1]	693	6	51	989.8	1,014.2	−1.0	60.4	−2.4	86	26	72	29	30	49	44	51	76	3.72	+1.9	11	10.1	se.	32	nw.	19	7	6	18	6.5	.0	.0	2

See footnotes at end of table.

CLIMATOLOGICAL DATA FOR WEATHER BUREAU STATIONS—Continued

District and station	Elevation in instruments: Barometer above sea level	Thermometer above ground	Anemometer above ground	Pressure: Station	Sea level	Departure from normal	Temperature of the air: Mean max. + mean min. ÷ 2	Departure from normal	Maximum	Date	Mean maximum	Minimum	Date	Mean minimum	Greatest daily range	Mean temperature of the dew-point	Mean relative humidity	Precipitation: Total	Departure from normal	Days with 0.01 inch or more	Wind: Average hourly velocity	Prevailing direction	Maximum velocity: Miles per hour	Direction	Date	Clear days	Partly cloudy days	Cloudy days	Average cloudiness, tenths	Total snowfall	Snow, sleet, and ice on ground at end of month	Number of days with thunderstorms
Ohio Valley and Tennessee	Ft.	Ft.	Ft.	Mbs.	Mbs.	Mbs.	°F. 42.2	°F. −1.1	°F.		°F.	°F.		°F.	°F.	°F.	% 73	In. 5.27	In. +1.0		Mi								0-10 6.7	In.	In.	
Chattanooga [1]	762	6	66	989.8	1,017.6	−.4	50.2	+1.1	81	26	62	22	9	30	42	40	76	7.52	+1.7	13	9.2	s.	48	nw.	27	11	6	14	5.9	T	.0	5
Knoxville [1]	995	27	53	981.4	1,017.6	−.4	49.4	+1.9	82	26	60	23	10	39	38	38	72	6.08	+1.0	14	9.7	ne.	45	w.	7	13	2	16	5.7	T	.0	5
Memphis [4]	399	5	86	1,002.0	1,016.6	−.7	52.0	+.1	80	14	63	28	9	41	32	41	71	5.20	−.1	13	9.1	e.	28	w.	7	11	8	12	5.6	T	.0	6
Nashville [1]	546	5	72	997.0	1,016.9	−.7	48.8	−.4	80	15	60	22	9	38	29	38	70	5.81	+.7	16	9.9	s.	36	w.	4	12	5	14	5.8	T	.0	4
Lexington	989	6	----	981.7	1,019.0	+1.4	42.1	−1.6	81	15	54	10	9	31	43	----	----	5.29	+1.0	16	----	w.	----	----	----	11	5	15	6.2	.6	.0	3
Louisville [2]	525	106	120	998.0	1,017.3	−.3	43.2	−2.2	80	15	52	20	9	34	36	34	72	4.72	+.3	14	10.4	sw.	42	s.	6	5	10	16	6.5	.5	.0	2
Evansville [1]	431	12	40	1,001.0	1,017.3	.0	42.9	−1.5	79	15	54	17	9	32	39	32	70	4.63	+.4	15	10.8	s.	34	w.	4	5	12	14	6.6	.4	.0	4
Indianapolis [1]	823	5	54	986.1	1,016.9	−.4	36.8	−2.0	73	15	47	11	9	27	33	29	78	4.20	----	16	13.2	w.	38	w.	7	4	8	19	7.2	3.3	.0	3
Terre Haute [2]	575	68	149	995.9	1,017.6	----	39.6	−2.1	74	14	49	17	8	30	35	29	72	2.62	−1.1	16	11.8	w.	31	e.	28	6	7	18	7.1	1.2	.0	2
Cincinnati [3]	627	11	51	994.2	1,017.6	.0	40.4	−.5	82	15	50	15	9	30	37	31	74	5.40	+1.5	12	9.1	sw.	27	sw.	7	4	10	17	7.0	1.4	.0	4
Columbus [2]	822	90	110	987.1	1,017.6	+.3	37.6	−1.5	77	15	46	12	9	29	35	28	74	5.41	+1.9	15	11.7	s.	34	s.	25	4	6	21	7.8	3.2	.0	2
Vandalia [1]	1,003	6	55	980.0	1,017.6	----	36.0	−2.7	74	15	45	10	9	27	34	28	77	4.70	+1.0	11	14.0	w.	40	s.	29	3	6	22	7.8	2.0	.0	2
Elkins [2]	1,947	61	78	947.2	1,018.6	+1.0	38.3	−1.7	74	15	49	2	10	28	44	28	78	5.38	+1.6	17	7.8	w.	29	se.	6	5	5	21	7.5	4.5	.0	1
Parkersburg	637	77	84	994.2	1,018.0	+.4	40.4	−2.4	83	15	50	13	10	30	45	30	71	5.52	+2.0	13	7.5	se.	30	nw.	4	8	6	17	6.6	1.6	.0	4
Pittsburgh [1]	842	39	54	986.5	1,018.0	+.7	36.0	−1.2	75	15	45	10	9	27	35	26	71	5.50	+2.5	15	12.0	w.	35	se.	29	1	17	13	7.1	9.8	.0	3
Lower Lake Region							30.7	−1.7									75	2.78	+0.1										7.3			
Buffalo [1]	768	34	96	988.8	1,018.3	+1.7	30.0	−1.3	62	25	38	3	5	22	37	22	74	2.91	+.3	20	15.5	sw.	41	s.	29	2	11	18	7.3	10.5	.6	0
Canton	448	10	61	1,001.4	1,018.3	----	25.4	−2.4	60	25	35	−16	5	16	42	18	74	1.76	−.7	16	19.7	sw.	29	sw.	8	5	11	15	6.8	8.3	.0	0
Oswego	335	71	85	1,005.8	1,019.0	+2.7	28.8	−2.4	64	25	36	2	6	22	34	18	66	2.76	+.2	18	11.1	se.	27	se.	6	6	12	13	6.7	16.6	.0	0
Rochester	523	5	69	998.6	1,019.0	+2.4	29.7	−.1	67	25	38	−4	5	21	39	20	74	2.12	−.6	15	12.3	w.	42	w.	16	1	9	21	7.8	7.6	T	0
Syracuse [1]	596	5	57	996.3	1,019.3	+2.7	28.8	−.9	64	25	38	−8	5	20	46	21	76	2.90	−.4	21	11.4	sw.	42	se.	7	2	9	20	7.7	12.6	T	0
Erie [2]	714	57	81	990.9	1,018.3	+1.7	32.2	−1.3	69	25	40	11	5	25	36	24	79	3.23	+.6	17	10.5	w.	40	se.	29	3	16	12	6.8	10.7	T	1
Cleveland [1]	762	27	54	988.8	1,018.0	+1.1	33.8	−.7	68	25	43	12	9	25	36	26	78	3.12	+.4	17	13.2	sw.	45	sw.	7	2	9	0	7.8	11.2	.0	1
Sandusky	629	5	67	993.6	1,018.0	+1.1	33.8	−1.3	67	25	41	11	10	26	35	----	----	3.04	+.3	15	11.4	sw.	30	w.	7	4	7	20	7.4	7.1	.0	0
Toledo [1]	628	5	47	993.6	1,018.0	+1.1	31.6	−2.2	61	11	40	7	10	24	32	26	79	2.68	+.1	13	14.8	ne.	38	sw.	7	6	13	12	6.7	6.2	.0	2
Fort Wayne [1]	857	5	33	984.8	1,017.3	----	32.0	−4.1	59	24	40	8	10	24	29	25	78	3.25	.0	16	11.1	w.	34	w.	7	2	6	23	8.0	3.6	.0	1
Detroit [1]	730	5	78	990.2	1,018.0	+1.1	31.2	−1.8	60	11	38	13	5	24	29	24	74	2.85	+.4	14	12.0	sw.	32	sw.	7	3	6	22	7.8	3.9	T	0
Upper Lake Region							26.4	−1.4									80	2.48	+0.4										7.8			
Alpena	609	5	89	993.6	1,016.9	.0	25.4	−.1	55	11	32	2	19	19	26	20	80	2.59	+.6	18	12.4	nw.	47	se.	29	3	7	21	7.7	16.5	3.3	0
Escanaba	612	51	72	992.9	1,016.3	−1.0	24.5	+.3	43	24	32	−5	19	17	37	19	82	1.50	−.4	12	10.6	nw.	29	e.	29	5	6	20	7.5	20.4	7.0	0
Grand Rapids [2]	707	70	244	990.2	1,016.9	.0	30.8	−2.6	60	24	37	13	20	24	26	22	80	2.60	+.1	14	13.6	e.	45	sw.	6	4	5	22	7.7	9.1	.2	0
Lansing [2]	878	5	90	984.1	1,017.3	----	28.8	−3.4	58	24	36	9	10	22	29	22	81	2.99	+.6	17	10.4	w.	26	sw.	6	2	10	19	7.5	9.6	T	0
Ludington	637	60	66	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
Marquette	734	44	73	987.5	1,015.9	−1.4	23.8	−1.0	54	24	30	0	18	18	26	18	77	2.53	+.3	19	8.2	n.	32	s.	10	1	8	22	8.5	23.6	5.7	0
Sault Sainte Marie [1]	614	11	52	992.9	1,016.6	−.3	20.1	−.5	42	11	28	−6	5	12	31	15	82	2.11	+.4	18	12.6	se.	46	se.	29	5	4	22	7.3	27.4	11.6	0
Chicago [1]	673	5	36	991.2	1,016.6	−.3	32.3	−2.2	65	24	39	9	9	26	31	26	78	4.51	+2.0	17	12.2	w.	34	w.	7	2	6	23	8.1	7.9	T	3
Green Bay	617	109	141	992.6	1,015.9	−1.4	26.9	−1.7	55	24	33	6	9	21	32	20	76	1.82	−.2	15	11.4	w.	30	sw.	30	4	6	21	7.9	14.1	T	0
Milwaukee [1]	681	33	66	990.5	1,016.3	−.6	29.4	−.7	62	24	35	5	9	24	30	24	76	2.46	.0	16	15.7	sw.	43	w.	6	1	8	22	8.4	7.1	.4	0
Duluth [2]	1,133	5	47	972.9	1,015.9	−2.1	21.7	−2.0	44	23	29	−11	9	14	32	16	86	1.65	+.1	17	11.9	nw.	42	nw.	7	7	6	18	7.0	19.4	8.0	0
North Dakota							17.8	−4.0									83	1.00	+0.1										7.4			
Fargo [1]	940	5	43	981.4	1,017.3	−1.3	20.2	−2.5	50	23	29	−15	9	11	36	16	82	1.26	+.2	11	14.3	n.	40	n.	7	3	9	19	7.3	13.6	1.2	0
Bismarck [1]	1,677	5	43	955.3	1,018.6	+.6	17.8	−4.1	48	31	27	−17	18	8	30	14	82	.43	−.5	8	12.5	nw.	38	w.	11	4	8	19	7.4	6.6	T	0
Devils Lake	1,478	11	44	962.1	1,018.3	+.7	15.2	−4.6	46	23	25	−12	18	5	34	12	80	.98	+.2	11	11.1	n.	33	n.	29	2	10	19	7.6	13.4	6.0	0
Lemmon, S. Dak.	2,602	4	38	921.8	1,018.0	----	15.8	----	42	10	26	−11	18	6	35	14	91	1.03	+.2	7	----	nw.	----	----	----	7	4	20	----	15.0	2.0	0
Grand Forks [1]	832	4	41	986.1	1,018.3	----	17.7	----	48	23	27	−18	9	8	40	14	----	1.43	----	15	----	nw.	----	----	----	4	6	21	----	24.6	2.2	0
Williston	1,878	42	50	948.9	1,018.0	+.7	17.9	−5.0	48	31	28	−15	12	8	36	12	78	1.32	+.6	15	8.0	nw.	28	nw.	11	3	8	20	7.5	14.7	T	0
Upper Mississippi Valley							33.3	−2.5									78	3.45	+1.1										7.2			
Minneapolis-St. Paul [1]	919	43	74	981.4	1,016.3	−1.3	25.8	−3.8	48	23	32	−2	9	19	30	20	80	1.20	−.2	13	11.9	nw.	41	nw.	6	4	8	19	7.4	11.1	1.5	0
Springfield, Minn.	1,025	4	42	978.3	1,016.9	----	25.4	----	53	23	32	−2	9	19	30	20	82	.77	----	12	----	nw.	----	----	----	4	7	20	----	8.4	.2	0
La Crosse [1]	714	5	29	989.2	1,016.6	−.7	27.9	−1.9	49	24	34	0	9	22	35	22	82	1.53	−.1	14	10.1	nw.	34	w.	6	4	9	18	7.4	15.2	T	0
Madison	974	70	78	979.7	1,016.3	−1.0	28.0	−2.6	58	24	34	2	9	22	33	22	80	2.74	+.7	15	9.6	ne.	25	sw.	24	2	11	18	7.7	11.4	T	2
Charles City	1,015	10	51	979.0	1,017.3	−.3	28.4	−2.3	52	23	35	0	9	22	35	----	----	2.55	+.8	14	7.9	nw.	25	nw.	6	5	9	17	7.1	18.1	.5	1
Davenport [1]	606	6	50	993.9	1,017.6	+.7	32.6	−2.2	65	24	40	8	9	26	38	26	78	5.27	+3.0	18	13.1	e.	38	w.	6	2	9	20	7.7	4.3	T	3
Des Moines [2]	860	5	99	984.1	1,016.6	−.7	31.6	−4.3	57	23	38	7	9	25	38	24	78	2.71	+.9	14	11.7	n.	32	nw.	7	5	9	17	7.3	12.8	.0	2
Dubuque	699	81	96	990.2	1,016.6	−.7	30.8	−3.2	63	24	38	5	9	24	36	24	76	3.00	+1.0	18	7.3	nw.	18	nw.	7	1	14	16	7.4	16.8	T	1
Burlington [1]	702	4	36	990.5	1,016.6	−.3	34.0	----	64	24	42	8	8	26	36	26	77	5.20	+2.5	15	13.7	nw.	41	nw.	7	1	9	21	8.0	4.7	.0	3
Cairo	357	5	99	1,003.7	1,016.9	−.4	47.5	−.2	79	15	57	25	9	38	33	----	----	5.12	+1.4	16	10.8	s.	29	nw.	7	6	11	14	6.2	.1	.0	4
Peoria [1]	609	6	26	994.2	1,016.9	.0	34.4	−1.6	67	24	42	10	8	27	33	27	77	5.92	+3.2	15	12.9	w.	34	w.	6	4	11	16	7.1	2.8	.0	1
Springfield, Ill. [3]	636	5	191	992.9	1,016.9	.0	38.1	−2.1	73	14	46	16	8	30	35	30	79	3.72	+.6	18	13.6	w.	36	w.	6	6	7	18	7.1	6.3	.0	5
St. Louis [1]	568	6	303	995.6	1,016.6	−.3	41.2	−2.9	79	14	50	18	8	33	38	30	70	2.49	−.9	10	13.8	nw.	38	nw.	6	7	11	13	6.5	2.8	.0	3
Missouri Valley							33.7	−4.2									78	2.80	+0.9										6.7			
Columbia, Mo. [2]	784	6	66	987.5	1,015.9	−1.0	40.4	−2.5	77	14	49	17	8	32	35	30	72	3.81	+.9	16	9.6	w.	24	nw.	4	8	8	15	6.3	5.6	.0	4
Kansas City [1]	963	38	76	----	1,016.3	−.3	39.2	−3.5	68	14	48	15	8	31	----	----	----	5.09	+2.8	12	12.8	ne.	35	nw.	7	7	7	17	----	1.5	.0	6
St. Joseph [2]	967	11	49	980.7	1,016.6	−.3	36.6	−3.9	63	10	45	13	8	29	36	28	74	3.78	+1.3	14	11.3	nw.	35	nw.	7	12	5	14	5.8	7.6	.0	3
Springfield, Mo. [1]	1,324	5	60	967.8	1,015.9	−.7	42.8	−2.8	75	14	53	18	8	33	37	33	76	3.26	−.1	13	14.8	se.	41	w.	7	10	4	17	6.3	6.2	.0	3
Topeka [1]	987	65	87	980.0	1,016.3	----	38.6	−4.0	67	31	48	15	8	30	37	30	76	4.90	+2.8	16	10.3	nw.	27	nw.	4	7	11	13	6.7	8.1	.0	4
Lincoln [2]	1,189	11	81	972.9	1,017.3	+.7	31.5	−6.0	61	31	38	5	8	24	33	24	78	2.24	+1.0	13	11.2	n.	37	nw.	7	4	8	19	7.6	15.5	.0	3
Omaha [1]	1,105	5	68	976.0	1,017.3	.0	31.1	−5.0	58	31	38	7	8	24	33	26	79	1.67	+.3	10	13.6	n.	38	nw.	7	5	9	17	7.0	13.4	.0	2
Valentine	2,598	46	54	922.5	1,017.6	+.7	24.2	−8.1	55	23	34	1	27	14	35	20	84	1.38	+.4	8	10.3	n.	31	sw.	5	7	7	17	6.6	11.9	1.0	0
Sioux City [1]	1,138	5	40	974.9	1,017.3	−.3	28.4	−3.7	57	31	36	6	19	21	36	24	82	1.07	−.1	8	12.6	nw.	35	nw.	7	5	6	20	7.3	11.0	.0	1
Huron [1]	1,301	5	41	968.8	1,017.6	−.4	24.0	−4.9	53	23	32	−2	18	16	30	20	84	.85	−.1	13	15.0	nw.	42	nw.	6	8	8	15	6.5	9.5	.0	0
Northern Slope							27.8	−4.9									71	1.31	+0.4										7.4			
Billings [1]	3,570	16	40	888.9	1,015.9	----	29.2	−4.8	58	23	39	−4	13	20	35	20	66	.33	----	7	12.8	sw.	49	nw.	23	3	3	25	8.0	6.5	.0	1
Havre [1]	2,507	11	67	926.5	1,018.6	+2.7	23.2	−3.9	62	30	35	−13	7	12	44	13	66	.63	+.1	10	9.0	sw.	42	sw.	9	1	4	26	8.1	7.4	.0	0
Helena [1]	4,124	5	43	872.3	1,019.0	+2.7	26.7	−5.0	56	9	38	−12	6	16	46	18	68	.51	−.3	11	10.4	w.	38	w.	23	5	8	18	7.2	9.7	.0	0
Missoula [2]	3,205	80	91	902.1	1,019.0	----	32.4	−3.3	57	29	41	2	14	24	35	23	72	1.24	+.3	13	6.4	w.	34	nw.	23	3	10	18	7.3	10.4	.0	0
Kalispell	2,973	48	56	911.6	1,017.3	+1.7	30.8	−2.1	56	30	40	1	14	22	28	21	68	.84	−.1	13	6.1	w.	27	ne.	12	3	7	21	7.7	4.9	.0	0
Miles City [1]	2,371	5	28	930.9	1,018.0	+1.4	23.6	----	56	31	34	−12	15	13	42	19	84	.96	----	10	----	nw.	----	----	----	4	4	23	7.9	3.4	.0	0
Rapid City [1]	3,259	5	63	899.4	1,017.6	+1.3	22.2	−9.4	53	23	32	0	14	13	43	19	87	1.13	+.2	11	15.6	nw.	52	nw.	5	1	13	17	7.6	12.7	3.4	0
Cheyenne [1]	6,094	5	40	807.3	1,014.6	.0	28.0	−5.1	56	1	39	−3	28	17	43	18	68	1.98	+1.0	11	13.9	nw.	46	nw.	23	2	12	17	6.9	22.0	.2	0
Lander	5,352	60	68	831.4	1,015.2	−.4	26.6	−5.8	54	10	39	−5	25	14	38	18	66	2.54	+1.4	9	5.2	sw.	38	sw.	4	5	13	13	6.4	27.2	1.4	0
Sheridan [1]	3,790	5	38	882.2	1,016.6	----	27.6	−3.8	58	23	38	−3	13	17	31	20	64	1.90	+.7	18	9.9	nw.	56	nw.	27	4	6	21	7.5	17.2	.8	0
North Platte [2]	2,821	11	51	914.3	1,015.6	−.3	31.0	−5.6	67	10	41	9	27	21	35	22	76	.98	+.1	7	9.2	n.	30	n.	7	4	10	17	7.0	10.1	0	0

See footnotes at end of table.

CLIMATOLOGICAL DATA FOR WEATHER BUREAU STATIONS—Continued

District and station	Elevation of instruments			Pressure			Temperature of the air												Precipitation			Wind										
	Barometer above sea level	Thermometer above ground	Anemometer above ground	Station	Sea level	Departure from normal	Mean max. + mean min. ÷ 2	Departure from normal	Maximum	Date	Mean maximum	Minimum	Date	Mean minimum	Greatest daily range	Mean temperature of the dew-point	Mean relative humidity	Total	Departure from normal	Days with 0.01 inch or more	Average hourly velocity	Prevailing direction	Maximum velocity: Miles per hour	Maximum velocity: Direction	Maximum velocity: Date	Clear days	Partly cloudy days	Cloudy days	Average cloudiness, tenths	Total snowfall	Snow, sleet, and ice on ground at end of month	Number of days with thunder-storms
	Ft.	Ft.	Ft.	Mbs.	Mbs.	Mbs.	°F.	°F.	°F.		°F	°F.		°F.	°F.	°F	%	In.	In.		Mi								0–10	In.	In.	
Middle Slope							40.2	−3.9									69	3.03	+1.5										6.3			
Denver	5,292	106	113	833.1	1,012.9	−1.3	34.5	−4.8	60	16	45	6	28	24	34	20	62	2.75	+1.7	11	8.8	s.	30	nw.	5	10	11	10	5.6	32.5	T	0
Pueblo	4,690	5	36	852.4	1,012.5	−.7	38.2	−2.6	72	13	53	9	22	23	52	20	58	1.36	+.8	10	10.6	nw.	40	sw.	13	10	9	12	6.0	11.5	.0	0
Concordia	1,392	50	58	965.8	1,016.6	+.3	34.6	−6.4	63	31	43	13	8	27	31	26	75	3.55	+2.3	12	9.6	nw.	30	nw.	7	6	9	16	6.9	23.5	.0	3
Dodge City [1]	2,509	5	58	925.2	1,014.9	.0	38.2	−4.6	66	17	50	14	29	26	39	29	76	1.41	+.5	7	18.9	n.	50	nw.	26	5	11	15	6.6	5.4	.0	1
Wichita [1]	1,358	6	64	965.8	1,015.6	.0	41.0	−4.1	70	31	51	19	29	30	33	32	72	4.55	+2.8	9	16.6	s.	44	n.	28	6	8	17	6.8	.4	.0	5
Oklahoma City [2]	1,214	10	47	970.9	1,014.9	−.3	47.3	−2.7	77	31	59	21	29	36	37	37	71	3.82	+1.8	7	11.2	s.	29	n.	28	10	4	17	6.2	2.2	.0	2
Tulsa [1]	674	10	61	990.9	1,015.2		47.4	−2.0	74	31	58	24	8	36	38	37	72	3.77	+.8	8	13.5	s.	38	n.	25	9	8	14	6.1	T	.0	4
Southern Slope							53.0	−0.9									58	0.36	−0.5										5.0			
Abilene [1]	1,738	4	41	952.3	1,013.2	−1.4	53.4	−1.8	87	26	66	24	29	40	46	40	65	.88	−.4	5	11.5	s.	29	s.	14	10	10	11	5.5	.0	.0	1
Amarillo [1]	3,676	5	42	885.9	1,012.9	−1.3	44.2	−1.1	76	17	60	13	29	28	47	28	63	T	−.7	0	17.4	sw.	48	sw.	3	14	7	10	4.9	T	.0	0
Del Rio	960	63	71	979.3	1,012.2	−2.0	63.2	−.3	90	26	74	35	29	52	40	46	60	.45	−.3	9	10.2	e.	34	nw.	19	8	9	14	5.8	.0	.0	2
Roswell	3,566	75	85	889.6	1,011.2	−1.3	51.0	−.3	80	24	67	19	29	35	49	25	44	.11	−.6	1	9.9	s.	38	ne.	18	15	12	4	4.0	1.0	.0	1
Southern Plateau							55.2	−1.5									46	0.56	+0.1										4.2			
El Paso [1]	3,778	5	85	883.5	1,010.5	−1.4	54.0	−.9	80	25	68	25	29	40	43	26	36	.15	−.2	2	12.9	sw.	44	s.	20	17	9	5	4.1	T	.0	0
Albuquerque [1]	5,314	5	48	834.4	1,011.2		44.4	−1.5	71	12	58	23	7	31	38	22	45	.49	.0	2	12.2	n.	51	s.	14	10	12	9	5.2	1.0	.0	0
Flagstaff	6,907	36	51	787.7	1,015.6	+2.7	33.8		61	31	47	0	15	21	44	18	57	2.00								13	10	8	4.8	15.7	1.1	0
Phoenix [2]	1,107	39	47	974.6	1,013.2	+.3	58.0	−2.7	81	11	72	37	21	44	39	36	56	.95	+.3	5		e.	30	w.	2	16	8	7	4.6	.0	.0	0
Tucson [1]	2,555	6	30	924.5	1,012.5		56.4	−1.3	82	25	71	31	22	42	40	30	44	1.01	+.3	3	7.0	nw.				18	3	10	4.3	.0	.0	1
Yuma	142	9	54	1,009.1	1,013.5	−.4	63.2	−.9	88	31	76	44	1	50	41	32	36	.20	−.1	4		n.	27	nw.	21	24	6	1	2.2	.0	.0	0
Independence	3,957	5	26																													
Middle Plateau							37.6	−2.7									58	1.47	+0.4										5.7			
Reno [1]	4,227	20	52	864.2	1,019.0	+3.8	39.6	−.4	70	31	56	5	14	23	50	22	58	1.13	+.3	3	7.6	nw.	43	s.	3	12	14	5	4.9	3.6	.0	.0
Tonopah	6,090	9	20	813.8	1,016.9		36.9	−3.6	60	10	48	7	14	26	34	23	63	.36	−.1	6		nw.				15	9	7		4.2	.0	.0
Winnemucca	4,339	5	56	869.3	1,019.3	+3.0	36.4	−3.6	64	30	50	11	14	23	45	22	58	.34	−.6	7	8.2	sw.	31	sw.	4	12	12	7	5.1	5.7	.0	.0
Modena	5,473	10	46	832.0	1,014.6	.0	35.4	−2.8	62	10	48	0	15	23	41			1.33	+.3	7	9.8	w.	38	sw.	25	15	8	8	4.7	6.7	.0	3
Salt Lake City [1]	4,227	32	46	866.9	1,017.3	+2.1	36.4	−3.6	63	30	45	16	16	28	33	26	68	3.67	+1.9	13	10.1	nw.	35	nw.	19	4	8	19	7.6	30.8	.0	2
Grand Junction	4,602	60	68	856.8	1,012.5	−1.4	40.4	−3.2	63	11	52	14	28	29	38	20	46	.88	+.1	7	6.8	nw.	30	w.	24	6	17	8	6.0	6.9	.0	3
Northern Plateau							38.4	−2.4									66	0.51	−0.6										6.5			
Baker [2]	3,471	36	54	897.4	1,020.3	+3.4	35.0	−2.6	63	29	46	13	14	24	38	24	66	.32	−.8	7	6.6	n.	23	n.	13	6	12	13	6.2	4.0	.0	0
Boise [1]	2,739	5	49	921.8	1,019.3	+2.4	38.4	−3.0	65	30	50	13	14	27	36	26	64	.18	−1.2	3	11.7	nw.	37	nw.	12	6	11	14	6.2	T	.0	0
Pocatello [1]	4,478	5	31	861.8	1,017.3	+1.0	33.7	−2.2	58	30	44	12	14	23	33	24	68	.52	−.8	6	12.0	sw.	38	s.	4	5	8	18	7.1	6.3	.0	1
Spokane [1]	1,929	27	42	948.9	1,019.0	+2.7	37.0	−2.7	64	29	47	12	14	27	36	26	64	.57	−.6	7	7.8	sw.	40	w.	23	6	9	16	6.8	2.0	.0	0
Walla Walla	991	57	65	984.1	1,020.3	+3.7	43.8	−2.3	70	30	53	18	14	35	29			1.27	−.3	7	7.1	sw.	28	w.	9	6	11	14	5.9	6.2	.0	1
Yakima	1,076	58	67	980.4	1,019.6		42.2	−1.9	71	30	54	17	14	30	36			.20	−.2	3	6.6	nw.	30	nw.	9	5	12	14	6.6	T	.0	0
North Pacific Coast Region							45.5	−0.1									70	3.08	−1.0										6.7			
North Head	211	5	56	1,014.9	1,022.7	+6.4	44.2	−1.0	64	29	49	34	13	40	19	38	78	3.88	−1.7	22	14.8	nw.	48	nw.	12	3	8	20	7.6	T	.0	0
Seattle [2]	125	90	321	1,017.3	1,021.7	+6.1	45.9	−.5	63	8	53	32	12	39	24	34	68	1.22	−1.8	10	9.6	s.	38	s.	22	4	12	15	7.0	.2	.0	0
Tacoma	194	172	201	1,014.6	1,021.3	+5.4	44.4	+.2	63	8	52	30	14	37	24			1.77	−1.7	11	9.3	sw.	35	n.	12	9	12	10	5.6	T	.0	0
Tatoosh Island	86	9	53	1,018.6	1,021.7	+7.1	43.8	+.9	55	28	48	34	10	40	16	36	74	8.57	+.7	15	15.2	w.	53	s.	22	4	7	20	7.6	T	.0	0
Medford [1]	1,329	29	58	973.9	1,021.7		46.2	−.7	74	29	59	21	14	33	44	32	62	1.57	+.1	6		nw.				9	8	14	6.1	T	.0	0
Portland, Oreg. [2]	154	68	106	1,017.3	1,022.7	+6.1	47.2	+.3	69	29	55	32	13	40	28	36	73	2.57	−1.3	13	5.8	nw.	20	ne.	11	7	10	14	6.4	.0	.0	0
Roseburg	510	45	76	1,004.4	1,022.7	+5.4	46.9	−.2	72	28	58	26	14	36	40	34	66	1.98	−1.3	10	4.4	n.	20	n.	13	4	16	11	6.6	.0	.0	0
Middle Pacific Coast Region							53.7	+1.0									62	1.50	−2.4										5.0			
Eureka	60	72	88	1,021.6	1,022.7	+4.7	47.7	−.6	67	28	54	35	14	42	25	41	78	2.25	−3.0	11	8.9	n.	32	n.	13	10	9	12	5.8	.0	.0	1
Redding [1]	722	20	34	992.9	1,018.6		55.8	+1.8	80	17	66	33	14	45	31	30	42	1.48	−3.2	4	9.2	nw.	33	nw.	19	9	8	14	5.9	.0	.0	1
Sacramento	66	92	115	1,016.3	1,018.0	+1.1	55.6	+1.3	82	31	67	34	14	44	35	38	58	1.42	−1.2	4	8.5	n.	32	n.	13	13	15	3	4.1	.0	.0	0
San Francisco [2]	155	112	132	1,013.9	1,019.0	+1.0	55.8	+1.6	73	28	63	44	14	49	22	42	70	.83	−2.3	3	8.7	w.	29	sw.	4	16	9	6	4.3	.0	.0	0
South Pacific Coast Region							57.7	+1.4									57	1.15	−0.9										4.2			
Fresno [1]	327	5	35	1,005.8	1,017.3	+1.0	54.8	+.4	80	30	68	29	14	41	35	36	56	.17	−1.4	1	5.9	nw.	30	nw.	13	17	6	8	4.3	.0	.0	0
Los Angeles	338	223	250	1,004.4	1,015.9	−.7	59.6	+2.1	82	9	69	41	14	50	26	38	52	2.47	−.3	5	7.2	w.	25	w.	13	19	3	9	4.0	.0	.0	0
San Diego [1]	87	20	55	1,013.2	1,015.9	−.7	58.7	+1.7	82	9	69	44	22	48	34	44	62	.80	−.9	6	6.5	w.	26	sw.	14	14	10	7	4.3	.0	.0	0
West Indies																																
San Juan, P. R.	82	10	54																													
Panama Canal																																
Balboa Heights	118	6	92		[3] 1,010.8	+.3	81.7	+.5	94	7	91	69	15	72	24		[3] 71	T	−.7	0	9.3	nw.	24	n.	1	16	13	2	3.8	.0	.0	0
Cristobal	27	47	97		[3] 1,011.9	.0	81.2	−.3	88	19	85	75	20	78	13	71	[3] 74	.18	−1.3	6	13.6	ne.	25	ne.	9	5	23	3	4.9	.0	.0	0
Alaska																																
Anchorage	132	6	44	1,007.8	1,012.9		20.6	−3.1	45	26	31	−19	30	10	33	14	66	.44	−.1	8	7.0	n.	33	s.	8	9	7	15	5.9	15.2	3.8	0
Fairbanks [1]	455	4	62	998.6	1,016.6		6.8	−2.8	42	14	19	−40	30	−6	44	4	79	.88	+.2	14	5.8	w.	28	w.	24	2	7	22	8.2	14.1	22.5	0
Juneau [1]	80	6	21	1,011.9	1,014.9		33.0		44	17	38	15	4	28	28	25	70	5.75		17	10.8	e.	39	s.	9	2	3	26	8.7	4.1	T	0
Nome	22	25	56	1,018.0	1,018.6		6.4	−2.3	35	25	15	−26	28	−2	31	4	82	1.19	+.4	18	8.5	ne.	30	ne.	15	5	7	19	7.1	9.5	24.1	0
Bethel	28	7	31	1,016.9	1,018.3		9.7	−2.4	42	15	18	−28	29	1	42	10	87	1.45	+.6	19	9.7	nw.	26	s.	16	6	6	19	7.3	13.2	18.3	0
Gambell	32	5	32	1,021.7	1,022.7		4.7	−2.8	33	25	10	−16	10	−1	31	4	89	.47	−.6	12	18.0	n.	48	ne.	5	11	6	14	6.0	4.5	18.0	0
Ketchikan	75	69	90	1,015.9	1,016.6		37.8	.0	50	8	43	25	26	33	20	30	76	18.69	+6.5	24	8.3	se.	20	e.	8	2	5	24	8.4	3.4	T	0
Kotzebue	20	8	31	1,018.3	1,019.0		−2.5	−1.9	31	1	6	−35	31	−11	30	−3	90	.43	+.2	13						6	4	21	7.4	5.8	12.4	0
McGrath	331	5	31	1,004.1	1,017.6		8.7		40	17	19	−32	11	−2	51	7	79	.80	.0	14		nw.	19	s.	4	5	5	21	7.5	14.4	40.0	0
Northway	1,718	5	32	949.5			8.6		46	17	20	−45	31	−3	50	5	78	.69		10	7.5		31		9	5	6	20	7.2	8.8	8.7	0
Hawaiian Islands																																
Honolulu	38	86	100	1,013.5	1,014.2		72.4	+1.0	80	13	77	62	23	68	13			5.45	+2.2	13	8.7	ne.	30	sw.	8	5	10	16	6.8	.0	.0	7

[1] Data are airport records.
[2] Barometric data (adjusted to old city elevation) and hygrometric data from airport; otherwise city office records.
[3] Observations taken bihourly.
[4] Pressure (adjusted to old city elevation) temperature and hygrometric data from airport; otherwise city office records.
[5] Temperature and precipitation from city office records, other data from airport.

NOTE.—Except as indicated by notes 1, 2, 4, and 5 data in table are city office records.

SEVERE LOCAL STORMS, MARCH 1944

(Compiled by Mary O. Souder)

[The table herewith contains such data as has been received concerning severe local storms that occurred during the month. A revised list of tornadoes will appear in the United States Meteorological Yearbook]

Place	Date	Time	Width of path, yards	Loss of life	Value of property destroyed	Character of storm	Remarks
Hugo, Okla	3	7:30 p. m.	100	0	$100,000	Tornado	$35,000 damage to the Goodland Indian School buildings; 100 homes and business houses slightly damaged or totally demolished. Unestimated damage to shade trees and timber.
Tampa, Kans., vicinity of.	3	6 p. m.	50	0	1,000	do	Schoolhouse moved 11 feet from its foundation; farm property damaged; a man injured; path 6 miles long.
Toronto, Kans., vicinity of.	3	7:45 p. m.	880		5,000	Wind	Windows and buildings and farm property damaged; path 6 miles long.
Westphalia, Kans	3	8 p. m.	440		3,000	do	Damage to farm property; path 2 miles long.
Flatwoods, Va., and vicinity.	4	4:45 p. m.		0	150,000	Tornado	9 houses destroyed; about 20 barns damaged or wrecked; 30 persons injured. Property damage, $100,000; loss in crops, $50,000.
Abingdon, Va	4	6:45 p. m.		0	500,000	do	About 50 buildings unroofed; 6 persons injured.
Bedford County, Va	4	8:15 p. m.		0	1,000	Electrical and wind	Interior of house damaged.
Delaware County, Ind	4				2,500	Glaze	Wires down.
Jackson, Ohio, vicinity of.	4			0	3,000	Tornado	Property damaged.
South Dakota	5-7					Wind and snow	Snow flurries throughout the State with accompanying low temperatures were especially hard on stock which required heavy feeding.
Denmark to Norway, S. C.	6	8 p. m.	500	0	10,000	Tornado	Buildings damaged; many trees uprooted; path 25 miles long.
Milwaukee, Wis	6-7				10,000	Wind	There were 28 chimney fires; one house burned to the ground and another considerably damaged.
Oswego County, N. Y.	8-9					Heavy snow	Through the use of snow plows, traffic was maintained on arterial highways, but many secondary roads were blocked. School buses unable to carry rural students; some schools closed.
South Dakota, northwestern portion.	10-31					Snow	Snow blocked roads and made it difficult to reach rough stock feed piles and some stock suffered as a consequence. Traffic delayed and canceled; some schools closed.
Agricola, Fla., vicinity of.	11	9:30 p. m. eastern war time.	150	0	5,000	Tornado	Large barn totally destroyed and several houses damaged; 100 orange trees broken off or uprooted and estimation of 500 boxes of oranges blown from trees; path 1 mile long.
Welcome, Fla	11	10 p. m., eastern war time.	150	0	5,000	do	2 dwellings unroofed; about 200 orange trees uprooted with others damaged and about 1,000 boxes of fruit estimated to have blown off trees. Number of small buildings damaged; path 3 miles long.
Indiana, northeastern portion of the State.	14				5,000	Glaze	Wires and trees damaged.
Hillsboro, Peebles, Circleville, and Jacksonville, Ohio, and vicinities.	19					do	Freezing rain coating wires and trees with ice, ranging upward to half an inch in thickness, damaged communication systems and transmission lines.
Memphis, southern and eastern portions, and Lynnville, Columbia, Jackson, Trenton, and Medina, Tenn.	26-27			5	2,000,000	Hail	Damage to roofs, windows, greenhouses, automobiles, airplanes, and utilities service lines; 7 persons injured, 1 seriously In Lynnville, house demolished, killing 5 persons, debris scattered over a wide area; Columbia, 2 large buildings badly damaged; Jackson, many houses unroofed and chimneys blown down; Trenton and Medina, houses unroofed and several persons injured and left homeless.
New York, western portion of State.	29					High winds	Damage to buildings and trees, amount unestimated.

SOLAR RADIATION AND SUNSPOT DATA FOR MARCH 1944

[Solar Radiation Investigations Section, I. F. HAND in charge]

NOTE.—Tables 1 and 2 of SOLAR RADIATION OBSERVATIONS section were not received in time to include in this REVIEW but will appear in the next issue.—EDITOR.

POSITIONS, AREAS, AND COUNTS OF SUNSPOTS FOR MARCH 1944

[Communicated by Capt. J. F. Hellweg, U. S. N. (Ret.), Superintendent, U. S. Naval Observatory.] All measurements and spot counts were made at the Naval Observatory from plates taken at the observatories indicated. Difference in longitude is measured from the central meridian, positive toward the west. Latitude is positive toward the north. Areas are corrected for foreshortening and expressed in millionths of Sun's hemisphere. For each day, under longitude, latitude, area of spot or group, and spot count, are included assumed longitude of center of the disk, assumed latitude of center of the disk, total area of spots and groups and total spot count.

Date	Eastern standard time	Mount Wilson group No.	Heliographic: Difference in longitude	Heliographic: Longitude	Heliographic: Latitude	Heliographic: Distance from center of disk	Area of spot or group	Spot count	Plate quality	Observatory
1944	h m		°	°	°	°				
Mar. 1	10 35	(*)	+35	292	−4	35	24	1	G	U. S. Naval.
				(257)	(−7)		24	1		
Mar. 2	10 48			No spots					G	Do.
Mar. 3	11 18	(*)	+25	256	+1	27	12	1	F	Do.
			+27	258	+1	29	6	1		
				(231)	(−7)		18	2		
Mar. 5	15 34			No spots					F	Do.
Mar. 6	10 42			No spots					F	Do.
Mar. 7				No spots						Mt. Wilson.
Mar. 8	10 22			No spots					F	U. S. Naval.
Mar. 9	10 36			No spots					G	Do.
Mar. 10	10 35			No spots					F	Do.
Mar. 11	10 19			No spots					G	Do.
Mar. 13	10 41			No spots					G	Do.
Mar. 14	10 46			No spots					F	Do.
Mar. 15	10 34	7635	−57	16	−26	58	6	1	G	Do.
				(73)	(−7)		6	1		
Mar. 16	10 49	7635	−47	13	−27	49	6	1	G	U. S. Naval.
		7635	−45	15	−25	47	6	1		
				(60)	(−7)		12	2		
Mar. 17	11 11	7635	−33	13	−27	39	97	11	F	Do.
		7635	−31	15	−26	35	48	5		
				(46)	(−7)		145	16		
Mar. 18	11 10	7636	−88	305	−20	88	121	2	F	Do.
		7636	−88	305	−24	88	485	1		
		7635	−20	13	−27	28	121	14		
		7635	−17	16	−26	25	48	7		
				(33)	(−7)		775	24		
Mar. 19†	12 0	7636	−83	296	−23	82	558			Mt. Wilson.
		7635	−8	11	−27	22	85			
				(19)	(−7)		††643			
Mar. 20†	13 15	7636	−58	308	−24	59	485			Do.
		7635	+6	12	−29	23	73			
				(6)	(−7)		††558			
Mar 21	12 22	7636	−45	308	−24	47	364	9	F	U. S. Naval.
		7636	−45	308	−20	46	61	1		
		7635	+17	10	−28	27	48	5		
		7635	+23	16	−27	30	24	2		
				(353)	(−7)		497	17		
Mar. 22	12 22	7636	−32	308	−24	86	291	6	G	Do.
		7636	−32	308	−21	34	61	1		
		7637	−20	320	+8	25	12	2		
		7637	−17	323	+6	22	24	4		
		7635	+30	10	−27	35	12	1		
		7635	+35	15	−28	39	24	1		
				(340)	(−7)		424	15		Do.
Mar. 23†	10 0	7636	−19	300	−24	25	291			Mt. Wilson.
		7637	−6	322	+6	15	12			
		7635	+49	17	−28	51	6			
				(328)	(−7)		††309			

POSITIONS, AREAS, AND COUNTS OF SUNSPOTS FOR MARCH 1944—Continued

Date	Eastern standard time	Mount Wilson group No.	Heliographic: Difference in longitude	Heliographic: Longitude	Heliographic: Latitude	Heliographic: Distance from center of disk	Area of spot or group	Spot count	Plate quality	Observatory
1944	h m		°	°	°	°				
Mar. 24	10 47	7638	−70	244	−7	70	12	3	G	U. S. Naval.
		7636	−6	308	−20	15	61	2		
		7636	−6	308	−23	17	291	9		
		7637	+9	323	+6	16	36	8		
				(314)	(−7)		400	22		
Mar. 25	10 39	7636	+5	306	−21	15	48	10	G	Do.
		7636	+7	308	−24	18	267	1		
				(301)	(−7)		315	11		
Mar. 26	11 21	7638	−45	243	−7	45	12	3	G	Do.
		7636	+18	306	−24	25	12	3		
		7636	+21	309	−20	25	24	1		
		7636	+21	309	−24	27	267	5		
				(288)	(−7)		315	12		
Mar. 27	14 2	7636	+36	309	−25	39	194	3	P	U. S. Naval.
				(273)	(−7)		194	3		
Mar. 28	10 28	7636	+48	310	−25	50	121	5	F	Do.
				(262)	(−7)		121	5		
Mar. 29†	10 40	7636	+62	310	−25	62	12			Mt. Wilson.
				(248)	(−7)		††12			
Mar. 30	11 56			No spots.					F	U. S. Naval.
Mar. 31	11 3			No spots.					G	Do.

Mean daily area for 25 days, exclusive of areas marked "††"=130

*Not numbered.
†Data from Mount Wilson chart.
VG=very good; G=good; F=fair; P=poor.
††Areas from drawings furnished by the Mount Wilson Observatory. Including these areas, the mean daily area for 29 days=165.

PROVISIONAL RELATIVE SUNSPOT NUMBERS FOR FEBRUARY 1944

[Based on observations at Zurich except as indicated by an asterisk. Data furnished through the courtesy of Prof. W. Brunner, Swiss Federal Observatory, Zurich, Switzerland]

February 1944	Relative numbers	February 1944	Relative numbers	February 1944	Relative numbers
1	7	11	0	21	*0
2	*7	12	0	22	0
3	0	13	0	23	0
4	0	14	0	24	0
5	*0	15	*0	25	0
6	0	16	*0	26	0
7	0	17	0	27	0
8	0	18	0	28	0
9	0	19	0	29	
10	0	20	*0		

Mean, 28 days=0.5

*Observed at Arosa or Locarno.

U. S. GOVERNMENT PRINTING OFFICE: 1944

Chart I. Departure (°F.) of the Mean Temperature from the Normal, and Wind Roses for Selected Stations, March 1944

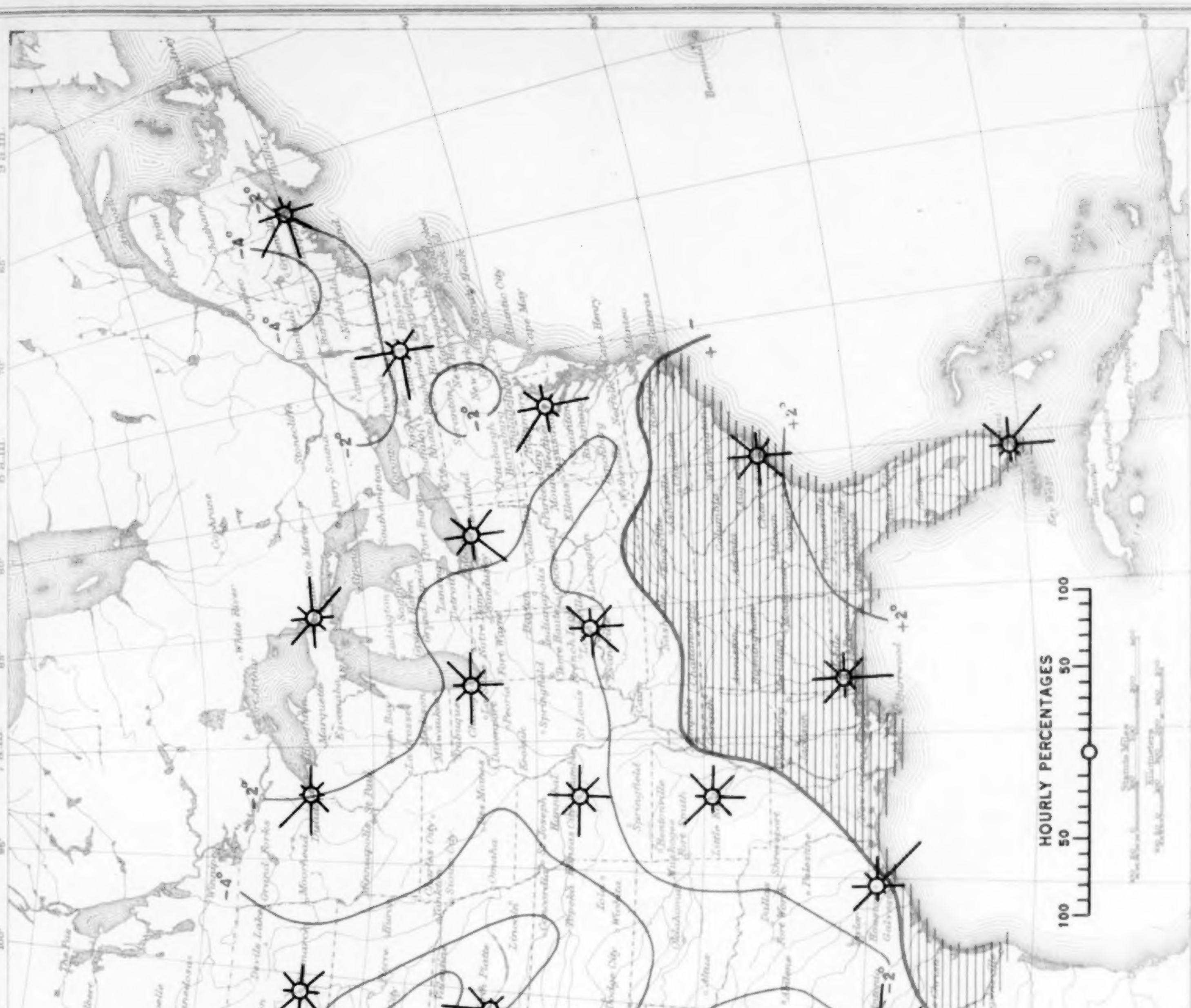
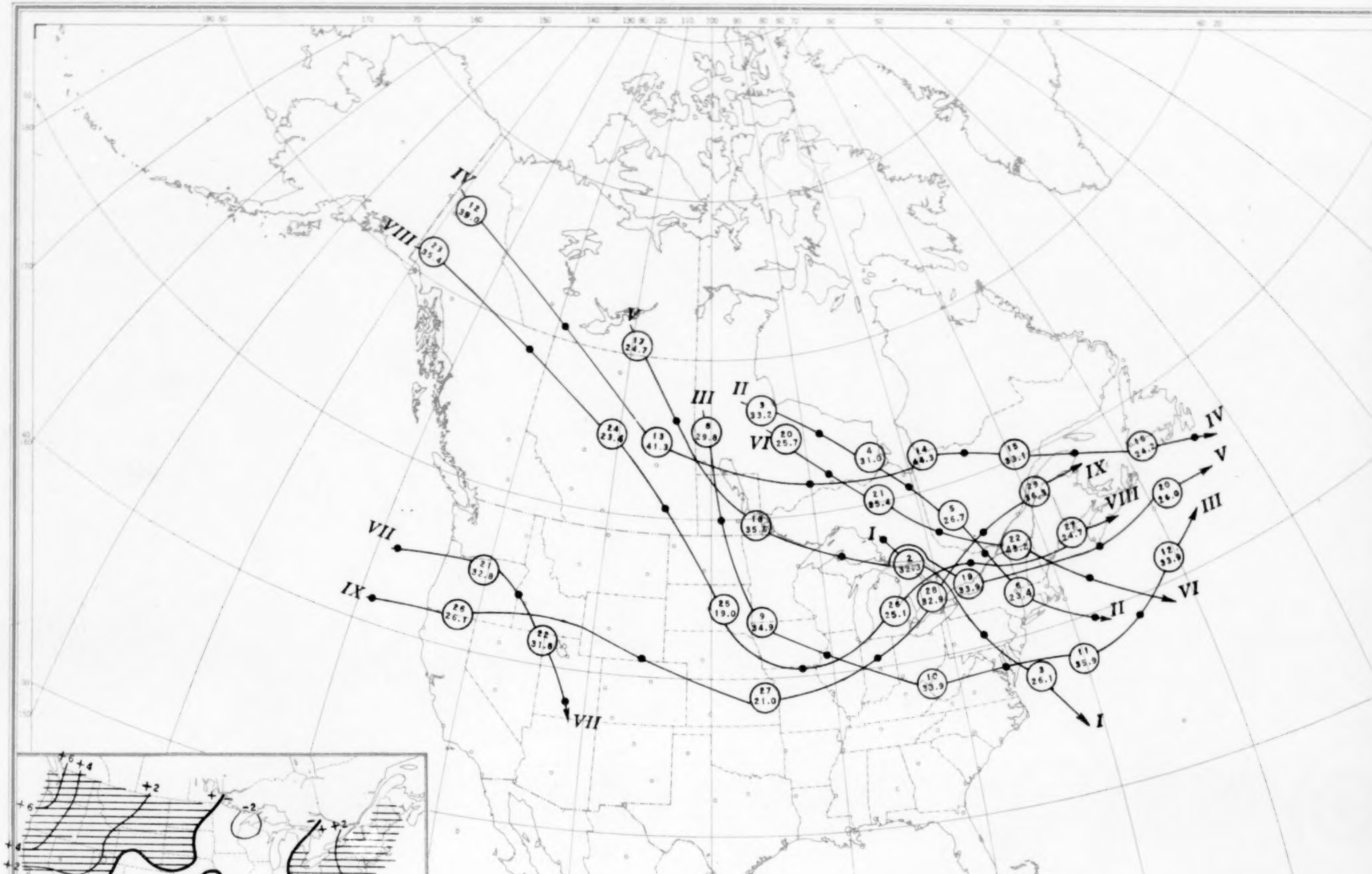


Chart II. Tracks of Centers of Anticyclones, March 1944. (Inset) Departure of Monthly Mean Pressure from Normal

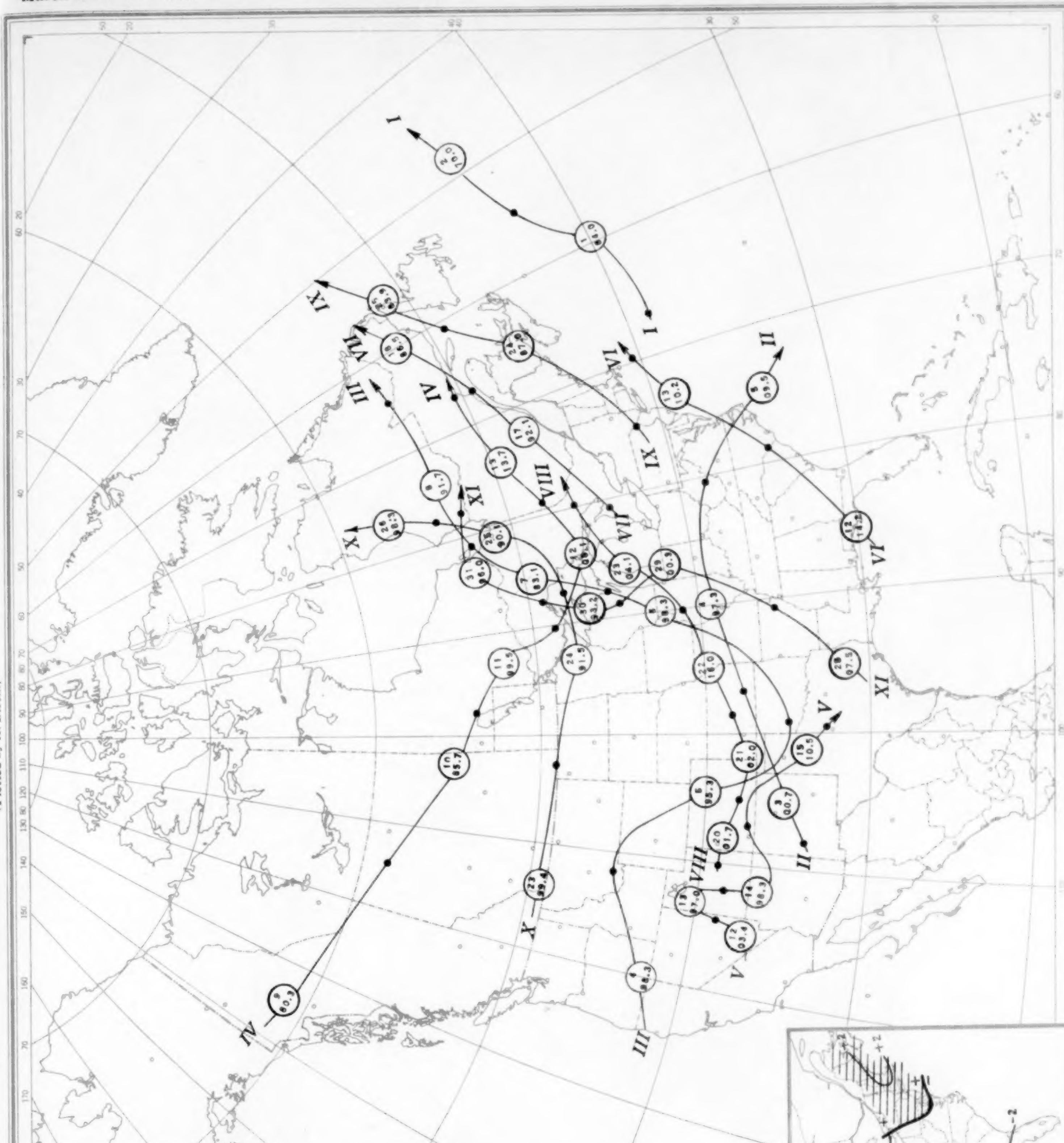
(Plotted by A. Bloom)



Circle indicates position of anticyclone at 7:30 a. m. (75th meridian time), with barometric reading. Dot indicates position of anticyclone at 7:30 p. m. (75th meridian time)

Chart III. Tracks of Centers of Cyclones, March 1944. (Inset) Change in Mean Pressure from Preceding Month

(Plotted by A. Bloom)



Circle indicates position of cyclone at 7:30 a. m. (75th meridian time), with barometric reading. Dot indicates position of cyclone at 7:30 p. m. (75th meridian time).

Circle indicates position of anticyclone at 7:30 a. m. (75th meridian time), with barometric reading. Dot indicates position of anticyclone at 7:30 p. m. (75th meridian time)

Chart IV. Percentage of Clear Sky Between Sunrise and Sunset, March 1944

Chart V. Total Precipitation, Inches, March 1944. (Inset) Departure of Precipitation from Normal

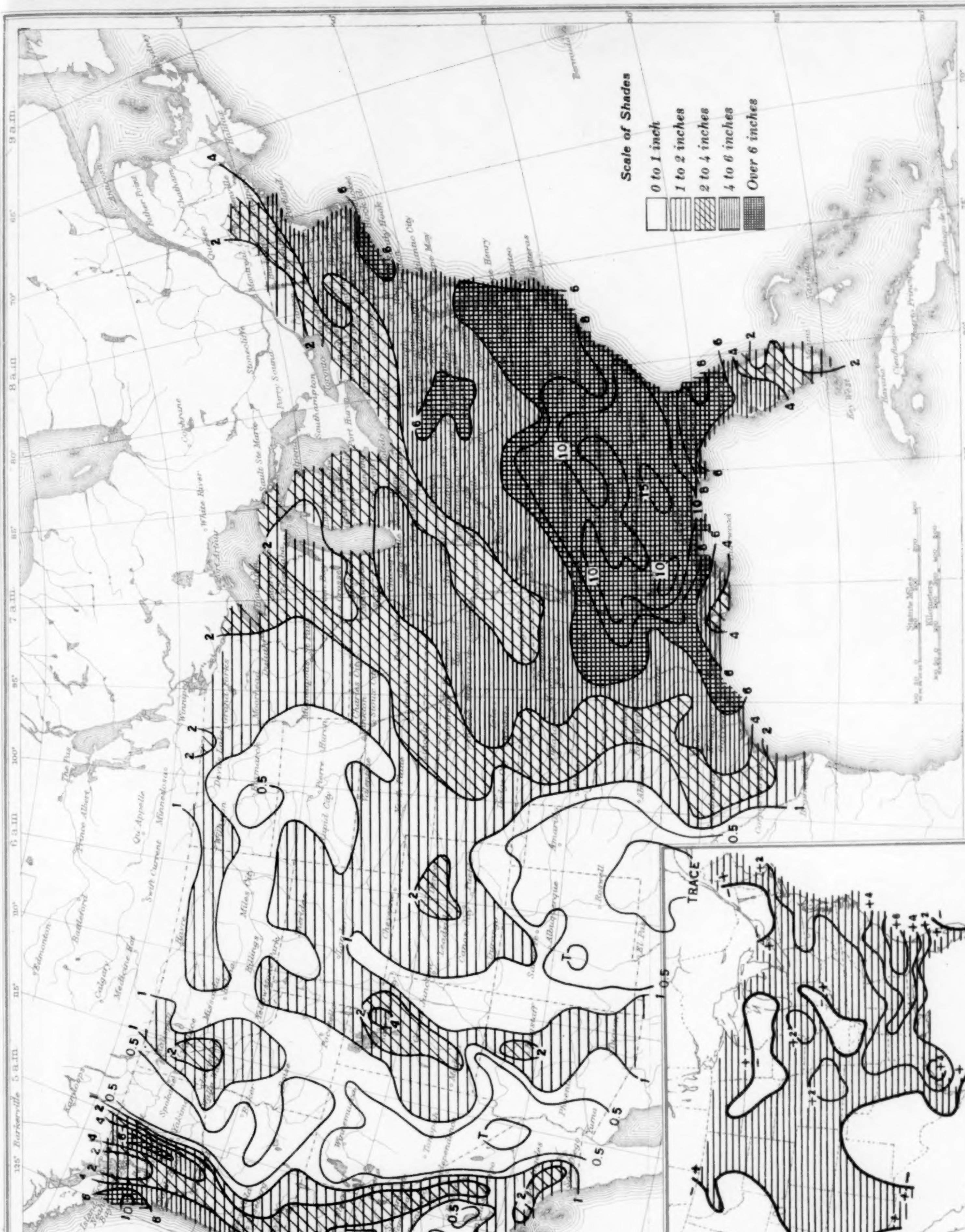


Chart VI. Isobars at Sea Level and Isotherms at Surface; Prevailing Winds, March 1944

Chart VII. Total Snowfall, Inches, March 1944. (Inset) Depth of Snow on the Ground at 7:30 p. m., Monday, March 27, 1944

Chart VII. Total Snowfall, Inches, March 1944. (Inset) Depth of Snow on the Ground at 7:30 p. m., Monday, March 27, 1944

Chart VIII. Isobars (mb) for 1,524 Meters (5,000 ft.), and Isotherms (°C.), and Resultant Winds for 1,500 Meters (m. s. l.) February 1944

Chart VIII. Isobars (mb) for 1,524 Meters (5,000 ft.), and Isotherms (°C.), and Resultant Winds for 1,500 Meters (m. s. l.) February 1944

Isobars and Isotherms based on radiosonde observations at 11:00 p. m. (E. S. T.) and winds based on pilot-balloon observations at 5:00 a. m. (E. S. T.).

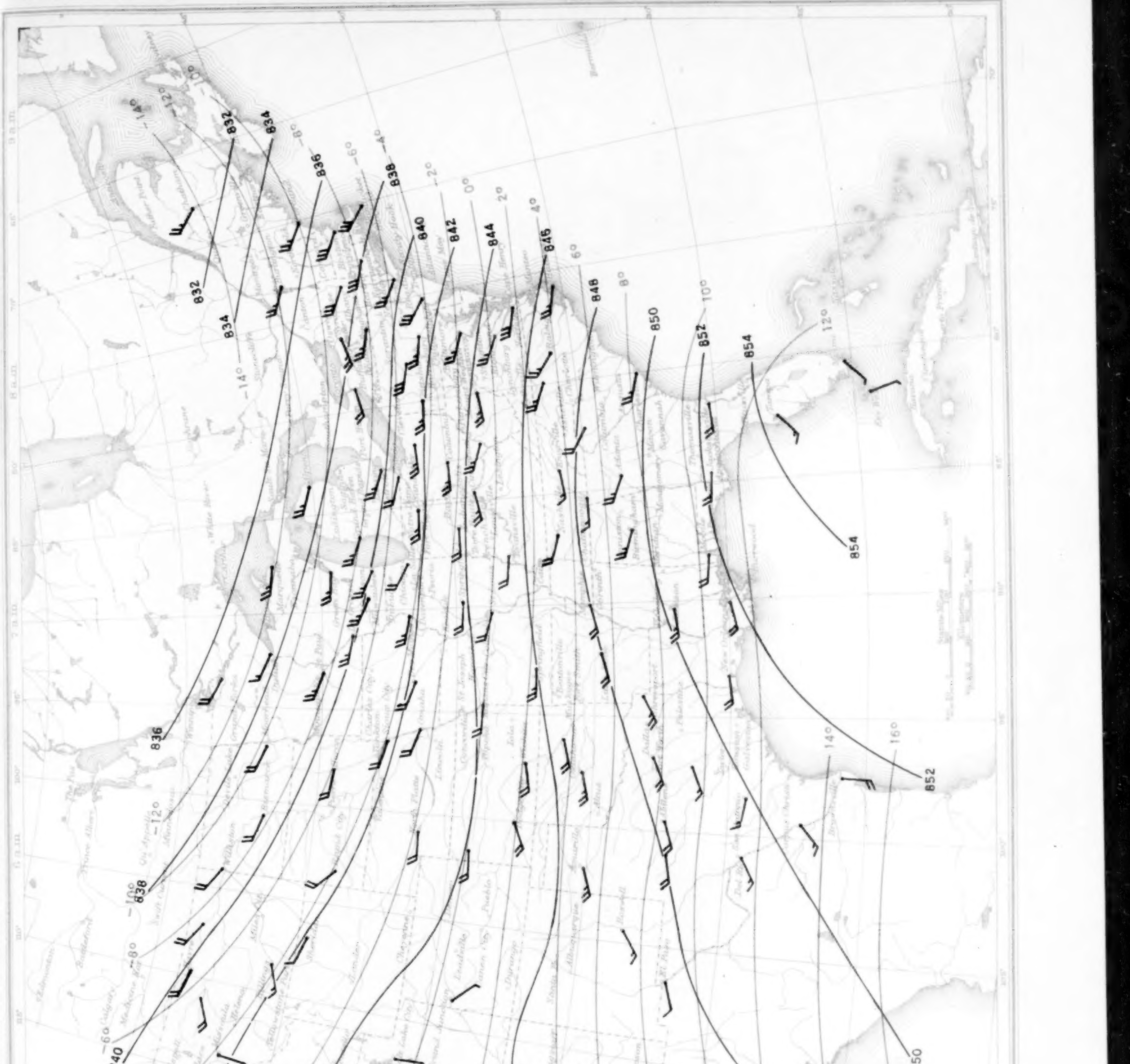


Chart IX. Isobars (mb), Isotherms (°C.), and Resultant Winds for 3,000 Meters (m. s. l.) February 1944

Isobars and Isotherms based on radiosonde observations at 11:00 p. m. (E. S. T.) and winds based on pilot-balloon observations at 5:00 a. m. (E. S. T.).

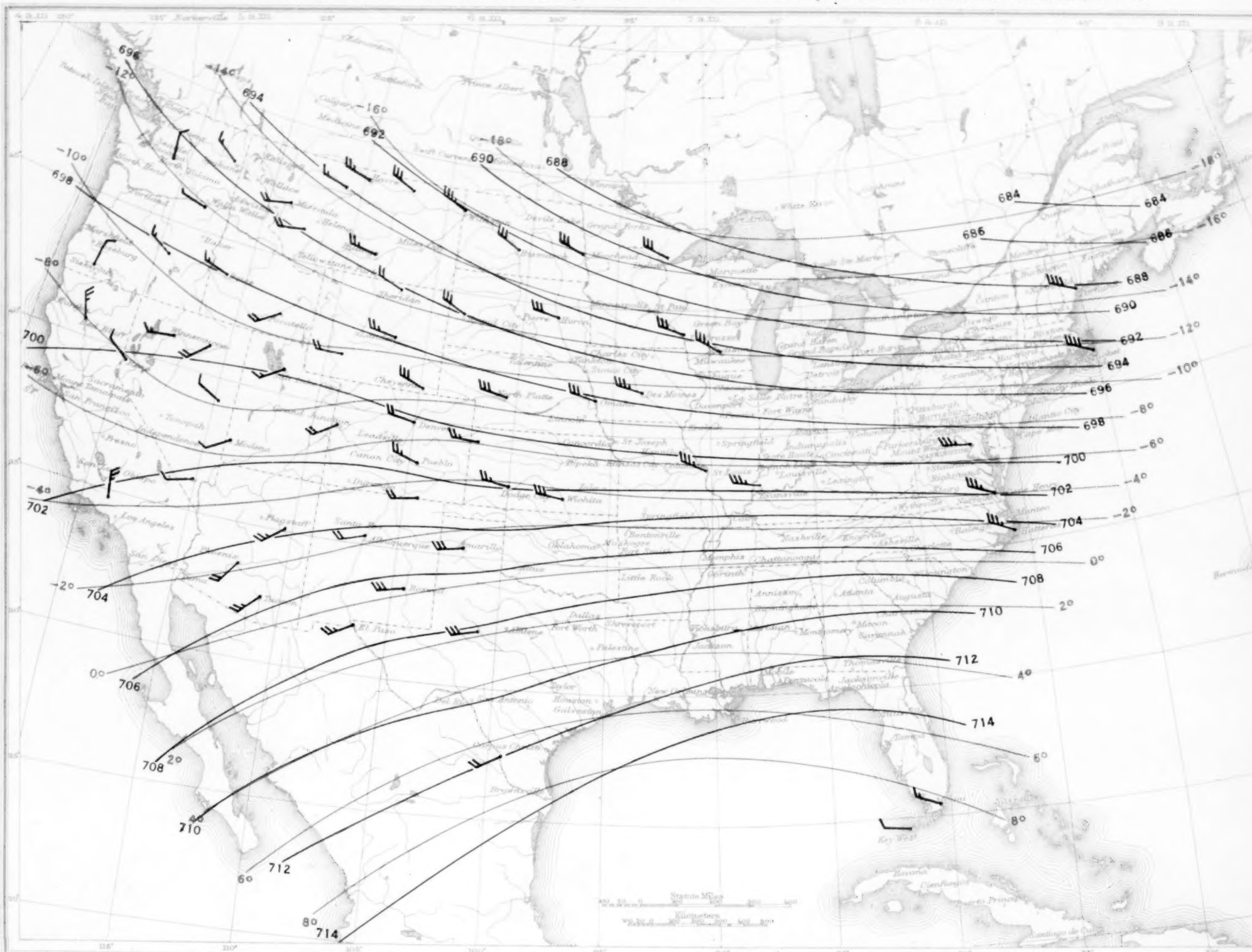


Chart X. Isobars (mb), Isotherms (°C.), and Resultant Winds for 5,000 Meters (m. s. l.) February 1944

Chart X. Isobars (mb), Isotherms (°C.), and Resultant Winds for 5,000 Meters (m. s. l.) February 1944

Isobars and Isotherms based on radiosonde observations at 11:00 p. m. (E. S. T.) and winds based on pilot-balloon observations at 5:00 p. m. (E. S. T.).

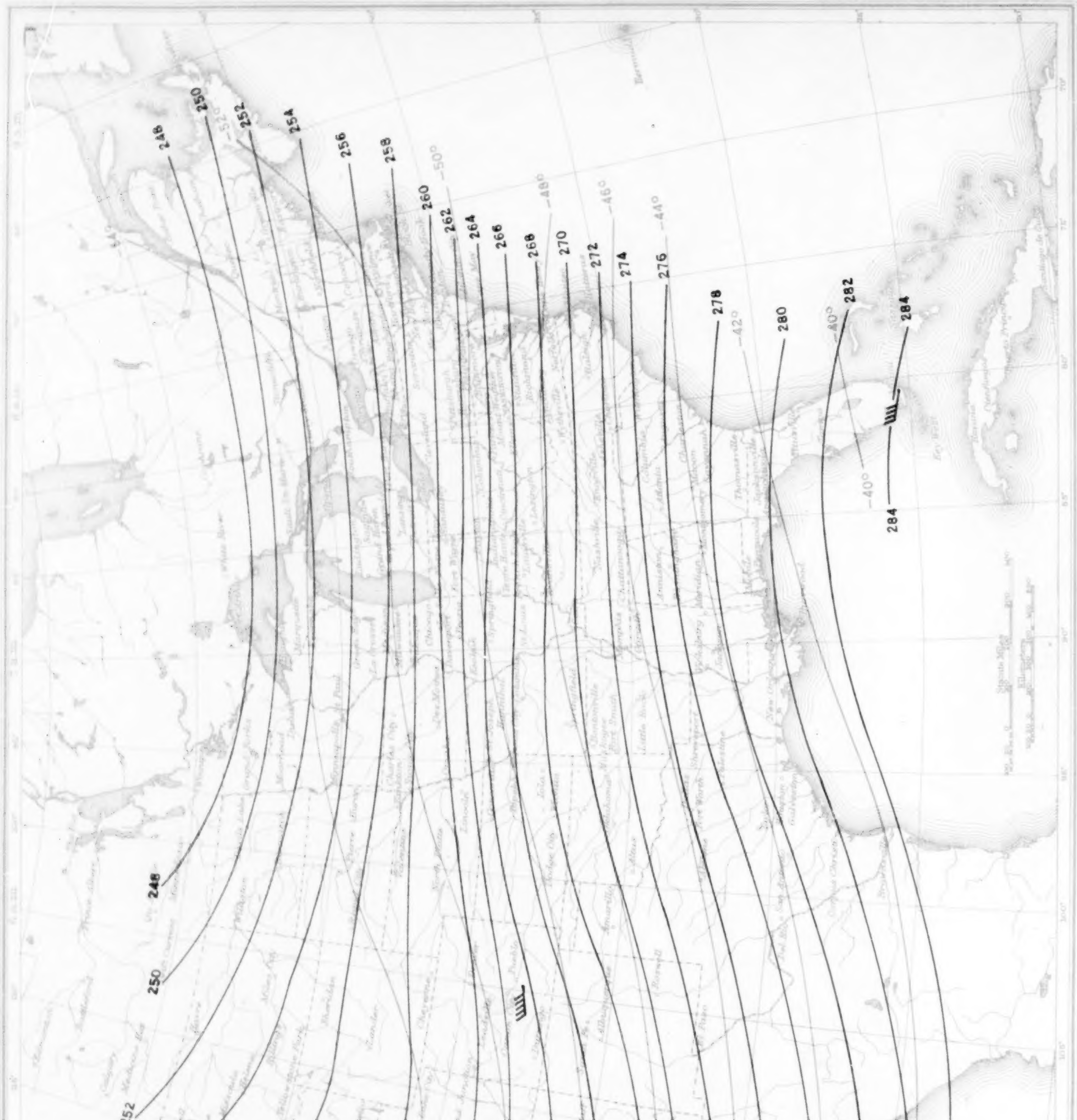


Chart XI. Isobars (mb), Isotherms (°C.), and Resultant Winds for 10,000 Meters (m. s. l.) February 1944

Isobars and Isotherms based on radiosonde observations at 11:00 p. m. (E. S. T.) and winds based on pilot-balloon observations at 5:00 p. m. (E. S. T.).